

**KLE Dr. M.S.SHESHGIRI
COLLEGE OF ENGINEERING & TECHNOLOGY
UDYAMBAG, BELAGAVI – 590008.**

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QUESTION PAPERS

3rd ,4th ,5th ,6th ,7th & 8th SEMESTER

CIVIL

AUG-SEPT- 2020

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Note: 2nd, 4th, & 6th Regular semester Exams are not conduct due to COVID-19 pandemic.

CV

CBCS SCHEME



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18MAT31

Third Semester B.E. Degree Examination, Aug./Sept.2020 Transform Calculus, Fourier Series and Numerical Techniques

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Find $L\{e^{-2t} \cos 2t\}$. (06 Marks)
- b. Express the function in terms of unit step function and hence find Laplace transform of :
- $$f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ t & 1 < t \leq 2. \\ t^2 & t > 2 \end{cases}$$
- (07 Marks)
- c. Solve the equation $y''(t) + 3y'(t) + 2y(t) = 0$ under the condition $y(0) = 1, y'(0) = 0$. (07 Marks)

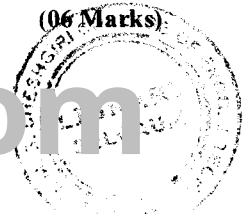
OR

- 2 a. Find :
- i) $L^{-1}\left\{\frac{s+3}{s^2-4s+13}\right\}$ ii) $L^{-1}\left\{\log\frac{(s^2+1)}{s(s+1)}\right\}$. (06 Marks)
- b. Find $L^{-1}\left\{\frac{s^2}{(s^2+a^2)^2}\right\}$ using convolution theorem. (07 Marks)
- c. A periodic function of period $2a$ is defined by
- $$f(t) = \begin{cases} E & 0 \leq t \leq a \\ -E & a < t \leq 2a \end{cases}$$
- Where E is a constant and show that $\text{trim } L\{f(t)\} = \frac{E}{S} \tan h\left(\frac{as}{2}\right)$. (07 Marks)

Module-2

- 3 a. Express $f(x) = x^2$ as a Fourier series in the interval $-\pi < x < \pi$. Hence deduce that
- $$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots = \frac{\pi^2}{12}$$
- (07 Marks)
- b. Obtain the Fourier series expression of $f(x) = \begin{cases} \pi x & 0 < x < 1 \\ \pi(2-x) & 1 < x < 2 \end{cases}$. (07 Marks)
- c. Obtain the half range cosine series for the function $f(x) = (x-1)^2, 0 \leq x \leq 1$. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



OR

- 4 a. Obtain the Fourier series of $f(x) = \left(\frac{\pi - x}{2}\right)$ $0 < x < 2\pi$. Hence deduce that
- $$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots = \frac{\pi}{4}. \quad (07 \text{ Marks})$$
- b. Obtain the half range cosine series of $f(x) = x \sin x$ $0 \leq x \leq \pi$. (07 Marks)
- c. Express $f(x)$ as a Fourier series upto first harmonic.

| | | | | | | |
|------|---|---|----|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| f(x) | 4 | 8 | 15 | 7 | 6 | 2 |

(06 Marks)

Module-3

- 5 a. Find the Fourier cosine transform of
- $$f(x) = \begin{cases} x & \text{for } 0 < x < 1 \\ (2-x) & \text{for } 1 < x < 2 \\ 0 & \text{for } x > 2 \end{cases} \quad (07 \text{ Marks})$$
- b. Find the Fourier transform by $f(x) = e^{-|x|}$. (07 Marks)
- c. Obtain the inverse Z – transform by $u(z) = \frac{z}{(z-2)(z-3)}$. (06 Marks)

OR

- 6 a. Find the Fourier transform by
- $$f(x) = \begin{cases} 1-|x| & |x| < 1 \\ 0 & |x| > 1 \end{cases}$$
- and show that $\int_0^{\infty} \frac{\sin^2 t}{t^2} dt = \frac{\pi}{2}$. (07 Marks)
- b. Find the z-transform of: i) $\cos n\theta$ ii) $\sin n\theta$. (06 Marks)
- c. Solve using Z –transform $u_{n+2} - 4u_n = 0$ given that $u_0 = 0$ and $u_1 = 2$. (07 Marks)

Module-4

- 7 a. Using Taylor's series method solve $y(x) = x + y$, $y(0) = 1$ then find y at $x = 0.1, 0.2$ consider upto 4th degree. (07 Marks)
- b. Solve $y'(x) = 1 + \frac{y}{x}$, $y(1) = 2$ then find $y(1.2)$ with $h = 0.2$ using modified Euler's method. (06 Marks)
- c. Solve $y'(x) = x - y^2$ and the data is $y(0) = 0$, $y(0.2) = 0.02$, $y(0.4) = 0.0795$, $y(0.6) = 0.1762$ then find $y(0.8)$ by applying Milne's method and applying corrector formula twice. (07 Marks)



OR

- 8 a. Solve $y'(x) = 3x + \frac{y}{2}$, $y(0) = 1$ then find $y(0.2)$ with $n = 0.2$ using modified Euler's method. (06 Marks)
- b. Solve $y(x) = 3e^x + 2y$, $y(0) = 0$ then find $y(0.1)$ with $h = 0.1$ using Runge-Kutta method of fourth order. (07 Marks)
- c. Solve $y'(x) = 2e^x - y$ and data is

| | | | | |
|---|---|-------|-------|-------|
| x | 0 | 0.1 | 0.2 | 0.3 |
| y | 2 | 2.010 | 2.040 | 2.090 |

Then find $y(0.4)$ by using Adam's Bash forth method. (07 Marks)

Module-5

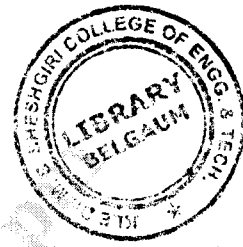
- 9 a. By applying Milne's predictor and corrector method to compute $y(0.4)$ give the differential equation $\frac{d^2y}{dx^2} = 1 - \frac{dy}{dx}$ and the following table by initial value. (07 Marks)

| | | | | |
|----|---|--------|--------|--------|
| x | 0 | 0.1 | 0.2 | 0.3 |
| y | 1 | 1.1103 | 1.2427 | 1.3990 |
| y' | 1 | 1.2103 | 1.4427 | 1.6990 |

- b. Derive Euler's equation in the standard form $\frac{\partial f}{\partial y} - \frac{d}{dx} \left(\frac{\partial f}{\partial y'} \right) = 0$. (06 Marks)
- c. Find the extremal of the functional $\int_{x_1}^{x_2} (y' + x^2 y'^2) dx$. (07 Marks)

OR

- 10 a. By Runge Kutta method solve $\frac{d^2y}{dx^2} = x \left(\frac{dy}{dx} \right)^2 - y^2$ for $x = 0.2$ correct to four decimal places. Using initial condition $y(0) = 1$, $y'(0) = 0$. (07 Marks)
- b. Prove that the shortest distance between two points in a plane is a straight line. (06 Marks)
- c. Find the curve on which the functional $\int_0^1 [y'^2 + 12xy] dx$ with $y(0) = 0$, $y(1) = 1$. (07 Marks)



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18MATDIP31

Third Semester B.E. Degree Examination, Aug./Sept.2020 Additional Mathematics – I

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Prove that $(1 + i)^n + (1 - i)^n = 2^{n/2+1} \cos \frac{n\pi}{4}$ (08 Marks)
- b. Express the complex number $(2 + 3i) + \frac{1}{1-i}$ in the form $a + ib$. (06 Marks)
- c. Find the modulus and amplitude of the complex number $1 - \cos\alpha + i \sin\alpha$. (06 Marks)

OR

- 2 a. If $\vec{A} = i + 2j - 3k$, $\vec{B} = 3i - j + 2k$ show that $\vec{A} + \vec{B}$ is perpendicular to $\vec{A} - \vec{B}$. Also find the angle between $2\vec{A} + 3\vec{B}$ and $\vec{A} + 2\vec{B}$. (08 Marks)
- b. Show that the vectors $i - 2j + 3k$, $2i + j + k$, $3i + 4j - k$ are coplanar. (06 Marks)
- c. Find the sine of the angle between $\vec{A} = 4i - j + 3k$ and $\vec{B} = -2i + j - 2k$. (06 Marks)

Module-2

- 3 a. Obtain the Maclaurin's series expansion of $\sin x$ upto term containing x^4 . (08 Marks)
- b. If $u = \sin^{-1} \left[\frac{x^2 + y^2}{x - y} \right]$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u$. (06 Marks)
- c. If $u = f(x - y, y - z, z - x)$ prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$. (06 Marks)

OR

- 4 a. Prove that $\log(1 + x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots$ by using Maclaurin's series. (08 Marks)
- b. If $x = r \cos \theta$, $y = r \sin \theta$ find $\frac{\partial(x, y)}{\partial(r, \theta)}$. (06 Marks)
- c. If $z = e^{ax + by} f(ax - by)$ then show that $b \frac{\partial z}{\partial x} + a \frac{\partial z}{\partial y} = 2abz$. (06 Marks)

Module-3

- 5 a. Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$ (08 Marks)
- b. Find the unit vector normal to the surface $x^2y + 2xz = 4$ at $(2, -2, 3)$. (06 Marks)
- c. Show that the vector $(-x^2 + yz)i + (4y - z^2x)j + (2xz - 4z)k$ is solenoidal. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. A particle moves along the curve $x = t^3 + 1$, $y = t^2$, $z = 2t + 3$ where t is the time. Find the components of its velocity and acceleration at $t = 1$ in the direction $i + j + 3k$. (08 Marks)
- b. Find the values of a , b , c such that $\vec{F} = (x + y + az)i + (bx + 2y - z)j + (x + cy + 2z)k$ is irrotational. (06 Marks)
- c. Find $\text{div } \vec{F}$ and $\text{curl } \vec{F}$ where $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$. (06 Marks)

Module-4

- 7 a. Obtain the reduction formula for $\int_0^{\pi/2} \cos^n x \, dx$, $n > 0$. (08 Marks)
- b. Evaluate $\int_0^1 \frac{x^9}{\sqrt{1-x^2}} \, dx$ (06 Marks)
- c. Evaluate $\iint xy(x+y) \, dx \, dy$ over the area between $y = x^2$ and $y = x$. (06 Marks)

OR

- 8 a. Obtain the reduction formula for $\int_0^{\pi/2} \sin^n x \, dx$, $n > 0$. (08 Marks)
- b. Evaluate $\int_0^{\infty} \frac{x^2}{(1-x^2)^{7/2}} \, dx$ (06 Marks)
- c. Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} \, dz \, dy \, dx$ (06 Marks)

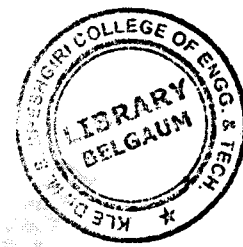
Module-5

- 9 a. Solve $y(\log y)dx + (x - \log y)dy = 0$ (08 Marks)
- b. Solve $x \frac{dy}{dx} + y = x^3 y^6$ (06 Marks)
- c. Solve $(xy^2 - e^{1/x^3})dx - x^2 y \, dy = 0$ (06 Marks)

OR

- 10 a. Solve $(5x^4 + 3x^2 y^2 - 2xy^3) \, dx + (2x^3 y - 3x^2 y^2 - 5y^4) \, dy = 0$ (08 Marks)
- b. Solve $\frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$ (06 Marks)
- c. Solve $(xy^3 + y)dx + 2(x^2 y^2 + x + y^4) \, dy = 0$ (06 Marks)

CBCS SCHEME



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18CV32

Third Semester B.E. Degree Examination, Aug./Sept.2020 Strength of Materials

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Sketch a typical stress-strain curve for a ductile material and explain briefly the salient features of the curve. (05 Marks)
- b. Derive an expression for the deformation of a rectangular tapering bar of uniform thickness. (05 Marks)
- c. Determine the value of P that will not exceed a maximum deformation of 2mm or a stress of 120 MPa in steel, 80 MPa in Aluminium and 115 MPa in bronze (Fig.Q1(c)). Given the following data:
- $A_b = 600 \text{ mm}^2$, $E_b = 0.84 \times 10^5 \text{ N/mm}^2$
 $A_a = 800 \text{ mm}^2$, $E_a = 0.7 \times 10^5 \text{ N/mm}^2$
 $A_s = 400 \text{ mm}^2$, $E_s = 2.1 \times 10^5 \text{ N/mm}^2$

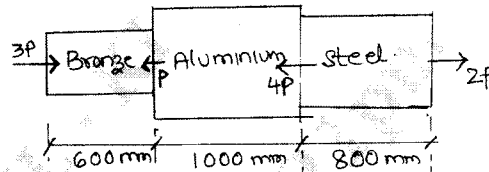


Fig.Q1(c)

(10 Marks)

OR

- 2 a. Derive the relationship between Young's modulus and bulk modulus. (05 Marks)
- b. A load of 270 kN is acting on a RCC column of size 200mm × 200mm. The column is reinforced with 10 bars of 12mm diameter each. Determine the stress in steel and concrete. $E_s = 16.5 E_c$. (05 Marks)
- c. A bar of brass 25mm diameter is enclosed in a steel tube of 50mm external diameter and 25mm internal diameter. The bar and tube are both initially 1m long and rigidly fastened at both the ends. Find the stresses in the two materials when the temperature rises from 10°C to 90°C.

If the composite bar is then subjected to an axial tensile load of 60 kN, find the resulting stresses given that: $E_s = 200 \times 10^3 \text{ MPa}$, $E_b = 100 \times 10^3 \text{ MPa}$, $\alpha_s = 11.6 \times 10^{-6}/^\circ\text{C}$, $\alpha_b = 18.7 \times 10^{-6}/^\circ\text{C}$. (10 Marks)

Module-2

- 3 a. Explain the maximum shear stress theory. (05 Marks)
- b. Explain the procedure for determining stresses in a general two dimensional stress system using Mohr's circle. (05 Marks)
- c. At a point in a strained material, the state of stresses is as shown in Fig.Q3(c), Determine the principal stresses, maximum shear stress and sketch the orientation of the principal planes.

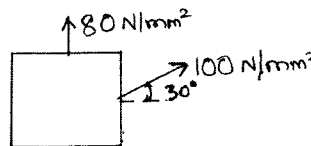


Fig.Q3(c)

(10 Marks)

of 3

OR

- 4 a. In a thin cylinder, show that the hoop stress is twice the longitudinal stress. (08 Marks)
 b. The maximum stress permitted in a thick cylinder of internal diameter 100mm and external diameter 150mm is 16 N/mm^2 . If the internal pressure is 12 N/mm^2 , what external pressure can be applied? Plot curves showing the variation of Hoop stress and radial stress through the material. (12 Marks)

Module-3

- 5 a. Define the terms:
 (i) Bending Moment (ii) Point of Inflexion. (04 Marks)
 b. Draw SFD and BMD for the cantilever beam shown in Fig.Q5(b).

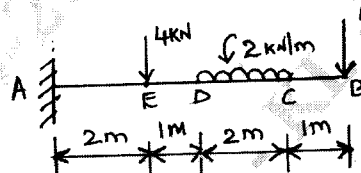


Fig.Q5(b)

(06 Marks)

- c. Draw SFD and BMD for a simply supported beam carrying two point loads of 12 kN at $1/3^{\text{rd}}$ span from either supports in addition to a UDL of 10 kN/m throughout span of beam is 6m. (10 Marks)

OR

- 6 a. Establish the relationship between shear force, bending moment and load intensity. (06 Marks)
 b. Draw SFD and BMD for the beam shown in Fig.Q6(b). Locate maximum shear force maximum bending moment and point of contraflexure.

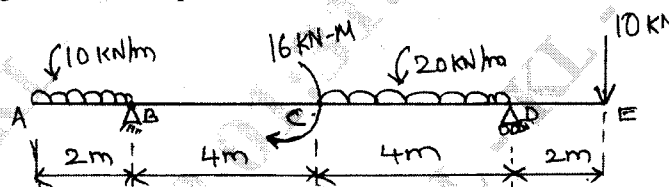


Fig.Q6(b)

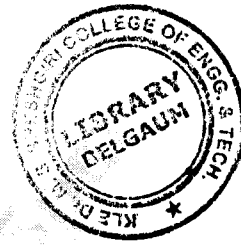
(14 Marks)

Module-4

- 7 a. Derive the simple bending equation in the form $\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$ with usual notations. (08 Marks)
 b. A beam of I section consists of $180\text{mm} \times 15\text{mm}$ flanges and a web of $280\text{mm} \times 15\text{mm}$. It is subjected to a bending moment of 120 kN-m and a shear force of 60 kN. Sketch the bending stress distribution and shear stress distribution along the depth of the section. (12 Marks)

OR

- 8 a. Derive the torsion equation for a circular shaft subjected to pure torsion. (10 Marks)
 b. A solid shaft of 60mm diameter is to be replaced by a hollow shaft of same length. The outer diameter of hollow shaft is same as that of solid shaft. If the angle of twist per unit torsional moment is the same in both cases, determine the inner diameter of hollow shaft. Take the modulus of rigidity of hollow shaft to be three times that of solid shaft. (10 Marks)



18CV32

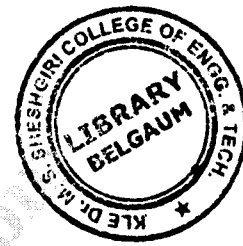
Module-5

- 9 a. Derive an expression for the slope and deflection of a simply supported beam carrying a central concentrated load. (08 Marks)
- b. A simply supported beam of constant cross section is 10m long. It is loaded with two point loads of 100 kN and 80 kN at points 2m and 6m from the left end respectively. Calculate the deflection under each load the maximum deflection. Take $E = 200 \text{ GPa}$ and $I = 18 \times 10^8 \text{ mm}^4$. (12 Marks)

OR

- 10 a. Distinguish between long and short columns. (04 Marks)
- b. What are the limitations of Euler's column theory? (04 Marks)
- c. A hollow cast iron column whose outside diameter is 200mm has a thickness of 20mm. It is 4.5m long and fixed at both ends. Calculate (i) Slenderness ratio (ii) Ratio of Euler's and Rankine's critical loads. Take $E = 100 \text{ GPa}$, $\alpha = \frac{1}{1600}$ and $\sigma_c = 550 \text{ N/mm}^2$. (12 Marks)

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18CV33

Third Semester B.E. Degree Examination, Aug./Sept.2020 Fluid Mechanics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define the following with symbols. Dynamic Viscosity, kinematic viscosity, surface tension. (06 Marks)
- b. Derive the expression for pressure intensity inside a soap bubble. (06 Marks)
- c. If 10,000 liters of certain liquid weigh 1329kN. Calculate:
i) Specific weight ii) Mass density iii) Specific volume and iv) Specific gravity. (08 Marks)

OR

- 2 a. Define gauge pressure, absolute pressure and atmospheric pressure and give the relation between them. (08 Marks)
- b. What is the difference between U-tube differential manometer and inverted U-tube differential manometer? Where are they used? (04 Marks)
- c. An U tube differential manometer connects two pressure pipes A and B. Pipe A contains carbon tetra chloride (1.594) under a pressure of 11.772N/cm² and pipe B contains oil (0.8) under a pressure of 11.772N/cm². The pipe A lies 2.5m above pipe B. Find the difference of pressure measured by mercury (13.6) as manometric fluid. The centre of pipe B coincides with manometer liquid in left limb. (08 Marks)

Module-2

- 3 a. Explain the procedure of finding the resultant pressure on a curved surface immersed in a liquid. (04 Marks)
- b. A circular plate of diameter 0.75m is immersed in a liquid of relative density 0.80 with its plane making an angle of 30° with the horizontal. The centre of the plate is at a depth of 1.50m below the free surface. Calculate the total pressure force on one side of the plate and the location of the centre of pressure. (08 Marks)
- c. A fluid flow field is given by $V = x^2yi + y^2zj - (2xyz + yz^2)k$. Prove that it is a core of possible steady in compressible fluid flow. Calculate the velocity and acceleration at the point (2, 1, 3). (08 Marks)

OR

- 4 a. Define:
i) Steady and unsteady flow (04 Marks)
ii) Compressible and incompressible flow. (08 Marks)
- b. Define velocity potential function and stream function and give their properties. (08 Marks)
- c. Check whether the stream function $\psi = 5xy$ is irrotational and if so, determine the corresponding velocity potential function ϕ . (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



Module-3

- 5 a. State Impulse-Momentum principle and give its any two applications. (04 Marks)
 b. Derive the Euler's equation of motion and then obtain Bernoulli's equation. (08 Marks)
 c. A reducer bend having an outlet diameter of 15cm discharges freely, the bend, connected to a pipe of 20cm diameter has a deflection of 60° (that is, change from initial to final direction is 60°) and lies in horizontal plane. Determine the magnitude and direction of force on the bend, when a discharge of $0.3\text{m}^3/\text{sec}$ passes through the pipe. (08 Marks)

OR

- 6 a. List the forces present in fluid motion and give equations of motion. (06 Marks)
 b. What is Pitot tube? Explain how it is used to find the velocity of flow in pipes or channel. (06 Marks)
 c. Find the discharge of water flowing through a pipe 30cm diameter placed in an inclined position where a venturimeter is inserted, having a throat diameter of 15cm. The difference of pressure between the main and the throat is measured by a liquid of specific gravity 0.6 in an inverted U-tube which gives a reading of 30cm. The loss of head between the main and the throat is 0.2 times the kinetic head of the pipe. (08 Marks)

Module-4

- 7 a. Give the classification of orifices. (04 Marks)
 b. Derive the expression for discharge through a rectangular notch. (08 Marks)
 c. A tank has two identical orifices in one of its vertical sides. The upper orifice is 3.0m below the water surface and lower orifice is 5.0m below the water surface. If the value of coefficient of velocity for each orifice is 0.96, find the point of intersection of the two jets. (08 Marks)

OR

- 8 a. Explain the different types of Nappe with sketches. (06 Marks)
 b. Derive the expression for maximum discharge over a broad crested weir. (08 Marks)
 c. Water flows over a rectangular weir 1.0m wide at a depth of 150mm and afterwards passes through a triangular right angles weir, taking coefficient of discharge for the rectangular and triangular weir as 0.62 and 0.59 respectively. Find the depth of water over the triangular weir. (06 Marks)

Module-5

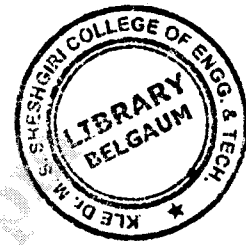
- 9 a. Derive Darcy-Weisbach equation for head loss due to friction in a pipe. (08 Marks)
 b. List the different types of loss in pipe flow. (04 Marks)
 c. When a sudden contraction from 60cm diameter to 30cm is introduced in a horizontal pipeline, the pressure drops from 100kPa at the upstream of the contraction to 80kPa on the downstream. Assuming a coefficient of contraction of 0.65, i) Estimate the flow rate in the pipe and ii) the loss of head due to sudden contraction. (08 Marks)

OR

- 10 a. What is water hammer? List the factors upon which it depends. (06 Marks)
 b. Obtain Dupit's equation for equivalent pipe. (06 Marks)
 c. Derive an expression for pressure rise in a pipe due to sudden closure of valve considering the elasticity of pipe material and compressibility of fluid. (08 Marks)

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CBCS SCHEME



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18CV34

Third Semester B.E. Degree Examination, Aug./Sept.2020 Building Materials and Construction

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Write the requirements of good building stones. Explain the factors causing deterioration of stone work and preservation of stone work. (10 Marks)
b. Explain briefly the tests conducted on bricks. (10 Marks)

OR

- 2 a. Explain the importance of size, shape and texture of coarse aggregates. (10 Marks)
b. Explain bulking with reference to fine aggregates with its importance and how the test for bulking is done. (10 Marks)

Module-2

- 3 a. Explain briefly the essential requirement of good foundation. (10 Marks)
b. Explain with sketches the following types of foundation :
(i) Combined footing
(ii) Strap beam footing. (10 Marks)

OR

- 4 a. Explain with sketches the features of English bond and Flemish bond in brick masonry, with their merits and demerits. (10 Marks)
b. Explain briefly following types of walls:
(i) Load bearing wall
(ii) Partition wall
(iii) Cavity wall. (10 Marks)

Module-3

- 5 a. Explain various modes failures of an arch. (10 Marks)
b. Define Lintel. Draw a neat sketch of an R.C.C. lintel with chejja indicating the positions of reinforcements. (10 Marks)

OR

- 6 a. Explain the factors which contribute in selection of flooring materials. (10 Marks)
b. Draw a neat sketch of a kind post truss indicating various elements. (10 Marks)

Module-4

- 7 a. Explain briefly the guidelines to be followed while locating doors and windows. (10 Marks)
b. Explain with neat sketches the following :
(i) Corner window
(ii) Bay window (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 8 a. Plan a doglegged stair for a building in which vertical distance between the floors is 3.6m. The stair room measures 3m × 5m (internal dimensions). (10 Marks)
- b. Write short notes on :
- (i) Shoring
 - (ii) Under pinning
- (10 Marks)

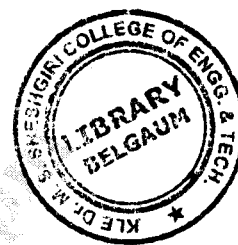
Module-5

- 9 a. Mention the objectives of plastering? Explain the requirements of good plaster and defects in plastering. (10 Marks)
- b. What are the causes of dampness? Explain any one method of damp proofing. (10 Marks)

OR

- 10 a. Mention the objectives of painting and point out the characteristics of an ideal paint. (10 Marks)
- b. Explain the procedure for :
- (i) Painting on new wood work
 - (ii) Painting on new iron work and steel work.
- (10 Marks)

CBCS SCHEME



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18CV35

Third Semester B.E. Degree Examination, Aug./Sept.2020

Basic Surveying

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Distinguish between : (i) Plane survey and Geodetic survey. (ii) Plan and map. (iii) Accuracy and precision. (06 Marks)
- b. What is ranging? Explain indirect or reciprocal ranging with neat sketch. (08 Marks)
- c. A line was measured by a 20 mt chain which was accurate before starting the day's work. After chaining 900 mt, the chain was found to be 6 cms too long. After chaining a total distance at 1575 mt, the chain was found to be 14 cms too long. Find the true distance at the line. (06 Marks)

OR

- 2 a. How is chaining performed on sloping ground by Direct method? Explain. (06 Marks)
- b. Explain the Basic Principles of surveying. (06 Marks)
- c. In chaining past a pond, stations A and D on the main line, were taken on the opposite sides of the pond. On the Left of AD, a line AB, 200 mt long was laid down and a second line, AC 250 mt long was ranged on the right of AD, the points B, D and C being in the same straight line. BD and DC were then chained and found to be 125 mt and 150 mt respectively. Find the length of AD. (08 Marks)

Module-2

- 3 a. Distinguish between : (i) Magnetic meridian and True Meridian (ii) WCB and QB. (iii) Isogonic line and Agonic line. (06 Marks)
- b. Differentiate between prismatic compass and surveyor's compass. (06 Marks)
- c. Following bearing were observed with a compass. Calculate the interior angles. (08 Marks)

| Line | AB | BC | CD | DE | EA |
|--------------|--------|--------|-------|---------|--------|
| Fore bearing | 60°30' | 122°0' | 46°0' | 205°30' | 300°0' |

OR

- 4 a. Define : (i) True meridian and true bearing. (ii) Isogonic line and Agonic line. (iii) Fore bearing and Back bearing. (06 Marks)
- b. The following are the bearings of a closed traverse ABCDEA. At what stations, do you suspect the local attraction? Find the corrected bearings of the lines. (07 Marks)

| Line | FB | BB |
|------|---------|---------|
| AB | 124°30' | 304°30' |
| BC | 68°15' | 246°0' |
| CD | 310°30' | 135°15' |
| DA | 200°15' | 17°45' |

- c. In the following traverse ABCDE, the length and bearing of line EA is omitted, calculate the length and bearing of line EA. (07 Marks)

| Line | Length (m) | Fore Bearing (FB) |
|------|------------|-------------------|
| AB | 204.0 | 87°30' |
| BC | 226.0 | 20°20' |
| CD | 187.0 | 280°0' |
| DE | 192.0 | 210°03' |
| EA | ? | ? |

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Define the following terms:
 (i) Benchmark (ii) Back sight (iii) MSL (iv) Reduced Level. (04 Marks)
- b. Explain the temporary adjustments of Dumpy level. (07 Marks)
- c. Following consecutive readings were taken with a level and a 4 mt leveling staff on a continuously sloping ground at common interval at 30 mt.
 0.855 (on A), 1.545, 2.335, 3.115, 3.825, 0.455, 1.380, 2.055, 2.855, 3.455, 0.585, 1.015, 1.850, 2.755, 3.845 (on B).
 The R.L of A was 380.500 mt. Make entries in a level book format and apply the usual check. Also determine the gradient at the line AB. (09 Marks)

OR

- 6 a. Define the following terms:
 (i) Benchmark (ii) Reciprocal leveling (iii) Height of Instrument
 (iv) Change point (06 Marks)
- b. Explain the temporary adjustments of Dumpy level. (07 Marks)
- c. The following staff reading were observed successively with a level, the instrument having been moved after 3rd, 6th and 8th readings:
 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684
 Enter the readings in level book format and calculated RL of all the points by Rise and Fall method if the first reading was taken with a staff held on Benchmark of elevation 432.384 mt. (07 Marks)

Module-4

- 7 a. List the advantages and disadvantages of plane table surveying. (08 Marks)
- b. What is the practical utility of three-point point? (04 Marks)
- c. Explain Radiation and intersection method of plane table surveying. (08 Marks)

OR

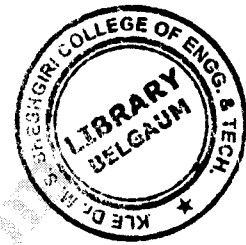
- 8 a. Explain the term orientation of plane table. Discuss orientation by back sighting. (06 Marks)
- b. List the methods of plane table surveying. Explain radiation method. (07 Marks)
- c. What is three-point problem? How is it solved graphically by Bessel's method? (07 Marks)

Module-5

- 9 a. Define a contour. Explain the characteristics of contour. (08 Marks)
- b. The following perpendicular offsets were taken at 10 mt intervals from a survey line to an irregular boundary line : 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65
 Calculate the area enclosed between the survey line, the irregular boundary line and the first and last offset by the applications of,
 (i) Average ordinate rule.
 (ii) Trapezoidal rule.
 (iii) Simpson's rule. (12 Marks)

OR

- 10 a. Discuss the methods of determining volumes. (06 Marks)
- b. List the uses of contours. (04 Marks)
- c. A Railway embankment is 10 mt wide with side slopes $1\frac{1}{2}:1$. Assuming the ground to be level in a direction transverse to the centre line, calculate the volume contained in a length of 120 mt, the centre heights at 20 mt intervals being in meters.
 2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5
 Use Trapezoidal and Prismoidal rules. (10 Marks)



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18CV36

Third Semester B.E. Degree Examination, Aug./Sept.2020 Engineering Geology

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is Geology? Describe the importance of Geology in Civil Engineering. (10 Marks)
b. What is Mineral? Define, describe the different physical properties which helps in the identification of minerals. (10 Marks)

OR

- 2 a. Describe the Earth's crust, Mantle and Core, with a neat diagram. (08 Marks)
b. Describe the following with mineral examples :
i) Lustre and its types ii) Fracture and its types. (06 Marks)
c. Write the physical properties, chemical composition and uses of :
i) Orthoclase ii) Calcite. (06 Marks)

Module-2

- 3 a. Explain Rock cycle. (05 Marks)
b. Give the classification of Igneous rocks. (10 Marks)
c. Describe the properties of GRANITE and its uses in different Civil Engineering Construction. (05 Marks)

OR

- 4 a. What is Rock Weathering? Describe the different types of weathering. (10 Marks)
b. What is Metamorphism? Describe the different agents of metamorphism. (10 Marks)

Module-3

- 5 a. What is Fold? With a neat diagram, describe the different parts of fold. (05 Marks)
b. Describe the different types of faults based on their mode of occurrence, with neat diagram. (10 Marks)
c. What are Joints? Write the classification and describe different types of tension joints. (05 Marks)

OR

- 6 a. What is Fault? With a neat diagram, describe the different parts of a fault. (08 Marks)
b. Describe the different types of folding on the basis of their axial plane, with neat diagram. (07 Marks)
c. Describe the causes of folding. (05 Marks)

Module-4

- 7 a. Describe with a neat diagram the hydrological cycle. (07 Marks)
b. Describe the vertical distribution of ground water in soil and rock. (07 Marks)
c. Describe : i) Specific yield ii) Specific retention. (06 Marks)

OR

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 8 a. What is an Aquifer? Describe the types of aquifer. (08 Marks)
b. Describe i) Porosity ii) Permeability. (04 Marks)
c. Describe the ground water exploration by Electrical Resistivity Method. (08 Marks)

Module-5

- 9 a. What is an Earth quake? Describe its causes and effects. (07 Marks)
b. What is Remote sensing? Describe the principles , advantages and disadvantages of remote sensing. (08 Marks)
c. Describe the process involved in Geographic Information System (GIS). (05 Marks)

OR

- 10 a. What are Landslides? Describe the causes and control measures. (08 Marks)
b. Describe the impact of mining on Environment. (06 Marks)
c. Describe the impact of reservoir on Environment. (06 Marks)



18CPC39

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Question Paper Version : A

Third Semester B.E. Degree Examination, Aug./Sept.2020
Constitution of India, Professional Ethics and Cyber Law
(COMMON TO ALL BRANCHES)

Time: 2 hrs.]

[Max. Marks: 100

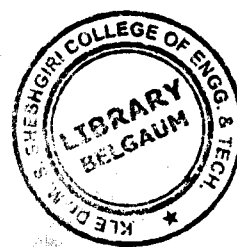
INSTRUCTIONS TO THE CANDIDATES

1. Answer all the Hundred questions, each question carries **ONE** mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, **darken** the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

-
1. Chairman of the Constituent assembly was _____ and _____ was the chairman of drafting committee.
a) Dr. Rajendra Prasad and Dr.B.R. Ambedkar
b) Dr.B.R. Ambedkar and Dr. Rajendra Prasad
c) Jawaharlal Nehru and Dr.B.R Ambedkar
d) Sardar Vallabhbai Patel and Dr.B.R. Ambedkar
 2. Which of the following writ is issued by the court in case of an illegal detention of a person by police.
a) Certiorari b) Mandamns c) Habeas Corpus d) Quo-Warranto.
 3. Who are not permitted to organize unions or associations?
a) Armed forces b) Government Servants
c) Unemployed Graduates d) Farmers.
 4. Right against exploitation seeks to protect the weaker sections of the society by
a) Giving equal pay for equal work for men and women
b) Prohibiting human trafficking and Beggar
c) Providing compulsory education for children below the age of 14 years
d) None of the these.
 5. Which one of the following is a feature common to both the Indian federation and the American federation?
a) A single citizenship b) Three lists in the constitution
c) Dual Judiciary d) A federal Supreme Court to interpret the constitution.



6. Which of the following laws exercised the most profound influence in framing Indian constitution?
 a) British Constitution
 b) US Constitution
 c) Irish Constitution
 d) The Government of India Act, 1935
7. Who headed the Interim Cabinet formed in the 1946?
 a) Rajendra Prasad
 b) Jawaharlal Nehru
 c) Sardar Vallabai Patel
 d) Rajagopala Chari.
8. The preamble in the constitution of independent India is modified version of which of the following:
 a) Bill of Rights in USA
 b) Objectives resolutions moved by Jawaharlal Nehru
 c) British Magna Carta
 d) Ideals of Communism.
9. Which one of the following determines that the Indian Constitution is federal?
 a) A Written and rigid constitution
 b) An Independent judiciary
 c) Vesting of residuary powers with the centre
 d) Distribution of powers between the centre and the states.
10. As per Indian protocol, who among the following ranks the highest in the order of precedence?
 a) Deputy Prime-minister
 b) Former President
 c) Governor of a state within his state/the state
 d) Speaker of Loka-Sabha
11. Which of the following constitutional provision strengthens Indian federalism?
 a) Single Citizenship
 b) Written Constitution
 c) Rigidity of Constitution
 d) Emergency provisions in the constitution.
12. The concept of public interest litigation originated in
 a) UK
 b) Australia
 c) USA
 d) Canada
13. Which of the following is/are the constitutional provisions facilitating union control over the states?
 i) All India services ii) Unified Judiciary iii) Officers of Governor iv) Grants-in-aid
 Select the answer which is correct using the code given below.
 a) 1 only b) 1 and 4 only c) 2 and 4 only d) 1, 3 and 4 only
14. In which of the following countries, the no-confidence motion to bring down the Government is adopted only when the confidence motion is passed in the alternate council of ministers?
 a) France b) Germany c) Italy d) Portugal
15. Indian Parliamentary system is different from the British parliamentary system in which of the following respects?
 a) Both a real and a nominal executive
 b) A system of collective responsibility
 c) Bicameral legislature
 d) A different judicial review
16. Which one of the following words was not contained in the original preamble to the Indian Constitution?
 a) Sovereign b) Secular c) Democratic d) Republic



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17. Consider the following statements regarding "Economic Justice" as enshrined in the preamble to the Constitution of India.
- a) It refers to absence of unemployment in India
 - b) It refers to equal wealth with everyone in India
 - c) It refers to possession of all forms of wealth under public sector
 - d) It refers to equal opportunity to everyone to raise one's standard of living.
18. In the Indian constitution, the right to equality is granted by
- a) Article 16 to 20
 - b) Article 15 to 19
 - c) Article 14 to 18
 - d) Article 13 to 17
19. An American citizen staying in India can not claim right to
- a) Freedom of trade and profession
 - b) Equality before the law
 - c) Protection of life and property, personal liberty
 - d) Freedom of Religion
20. The Constitution of India recognizes
- a) Only religious minorities
 - b) Only linguistic minorities
 - c) Linguistic and religious minorities
 - d) Religious, Linguistic and Ethnic minorities
21. Which one of the following rights was described by Dr. B.R. Ambedkar as the heart and soul of the constitution?
- a) Right of freedom of religion
 - b) Right to property
 - c) Right to Equality
 - d) Right to constitutional remedies
22. Which one of the following comes under the jurisdiction of both the High Court and the Supreme Court?
- a) Disputes between the centre and the state
 - b) Disputes between the states inter-states
 - c) Protection of the fundamental rights
 - d) Disputes on inter-state rivers
23. Which one of the following article of the directive principles of state policy deals with the promotion of International peace and security?
- a) 51
 - b) 48A
 - c) 43A
 - d) 41
24. The purpose of the inclusion of directive principles of the state policy in the Indian Constitution is to establish.
- a) Political Democracy
 - b) Legal democracy
 - c) Gaudian Democracy
 - d) Social and Economic democracy
25. Uniform Civil code is the proposal to replace the personal laws with a common set governing every citizen. The uniform civil code does not pertain to which of the following matters.
- a) Marriage
 - b) Inheritance
 - c) Maintenance
 - d) Defamation
26. The ideal of "Welfare State" in the Indian Constitution is enshrined in its.
- a) Preamble
 - b) Directive Principles of state policy
 - c) Fundamental rights
 - d) 7th schedule of the constitution
27. For a citizen of India, the duty to pay taxes is a
- a) Fundamental duty
 - b) Legal obligation
 - c) Constitutional obligation
 - d) Moral obligation

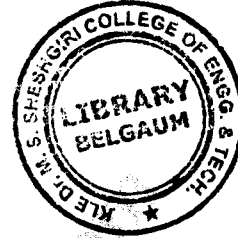
28. Fundamental Duties enshrined in our constitution are inspired from which of the following countries?
 a) Ex-USSR b) Sweden c) Norway d) USA
29. The president can be impeached for
 a) Violating the constitution
 b) Disregarding the parliament
 c) For not abiding by the advice of the Prime-Minister
 d) All of the above
30. The Chief-minister of a state in India is not eligible to vote in the presidential election if
 a) He himself is a candidate
 b) He is yet to prove his majority on the floor of the lower house of the state legislature
 c) He is a member of the upper house of the state legislature
 d) He is a caretaker chief-minster
31. Consider the following acts of parliament. Which of the following is not undertaken as per the discretionary power of the president?
 a) President asks the leader of a political party to form Government who enjoys majority in Lok-Sabha
 b) President asks the parliament to reconsider the financial bill
 c) President calls the session of the parliament when he has not been asked to do so
 d) President warns the council of ministers on their recommendation to appoint a particular person as CAG of India
32. In which of the following elections does the Vice-President participate?
 a) President b) Chairperson of Rajys Sabha
 c) Deputy chairperson of a Rajya Sabha d) None of the above
33. The Tenure of the Vice-president is _____
 a) 06 years b) 05 years
 c) 03 years d) Till he enjoys the support of the party
34. Who is the head of the council of ministers in the Union Cabinet/Ministers?
 a) Home minster b) Prime-Minister
 c) Speaker of parliament d) President
35. Who is the chief Advisor to President of India from the parliament?
 a) President b) Prime Minister
 c) Speaker of Parliament d) Vice-President
36. Council of Ministers is headed by the _____ and are appointed by president on the advice of _____
 a) Prime Minister and Prime Minister b) President and Prime Minister
 c) Prime Minister and President d) President and chief justice of India
37. The Cabinet includes only the _____ ministers.
 a) Prime Minister b) Cabinet
 c) State d) Union and State Rank



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38. _____ cabinet comprises Prime Minister and very close associates of Prime Minister.
a) General b) Kitchen c) Particular d) House
39. Who is the highest law officer in the country?
a) Additor General b) Chief Justice
c) President d) Attorney General
40. According to Article 88, _____ has the right to take part in parliamentary proceedings including right to speak.
a) Vice-President b) Attorney General
c) Advisor of parliament member d) Speaker of Loka Sabha
41. In India, the Union Legislature is called
a) Lokasabha b) Rajyasabha c) Parliament d) Vidhana Sabha
42. Rajyasabha is also known and called as
a) Council of States b) Council of the Lokasabha
c) Council of cabinet d) Council of Union Administration
43. Vice President of India is Ex-Officer Chairperson of
a) Lokasabha b) Rajyasabha c) Supreme Court d) President office
44. The life of the Lokasabha shall not exceed 06 months after the end of
a) War b) National Emergency c) States term d) President power
45. The minimum attendance of the members required for a proceedings of any house to begin is known as
a) Assembly b) Parliament c) Quorum d) Legislature
46. Presiding officer of Lokasabha is
a) Prime Minister b) Home Minister c) Speaker d) President
47. Leader of opposition in Lokasabha enjoys a statutory status equal to that of a _____
a) Speaker b) Deputy Prime Minister
c) Cabinet Minister d) Ministers of State Ranking
48. Delimitation of constituencies refers to redrawing of constituencies based on the latest _____
a) Census figures b) MP seats c) MLA/MLC seats d) People
49. As per convention, there are _____ sessions of parliament
a) Three regular b) Four regular c) Five regular d) Two regular
50. If refers to the end of session of parliament. Pending bills do not lapse by the act of _____
a) Adjournment b) Session c) Prorogation d) Parliament
51. Which article provides the information for the disqualification of the members of parliament?
a) 100 b) 101 c) 102 d) 103

52. Which hour starts immediately after the end of question hour and lasts until the agenda for the day i.e regular business of the house is taken up
 a) Question b) Notice c) Zero d) Replay
53. Any matter which is not covered under money, financial, or constitution amendment bill is covered under
 a) Money bill b) Ordinary bill c) Financial bill d) Parliament bills
54. Joint sitting/session is conveyed by the _____ and presided by the speaker of Lokasabha.
 a) Prime minister b) President c) Vice-President d) Deputy speaker
55. The maximum life of an ordinance can be
 a) 06 weeks b) 06 months
 c) 06 months and 06 weeks d) Till the parliament disapproves the ordinance
56. Who is not eligible to be a member of Departmental standing committee?
 a) Prime minster b) Minister c) Speaker d) President
57. Which article deals with the appointment of High Court Judges?
 a) 117 b) 217 c) 317 d) 417
58. 99th Amendment Act has provided the information about the creation/establishment of
 a) NHRC b) NJAC c) VICE d) NTSC
59. Under article 129, _____ court has been declared as a court of Record.
 a) District b) Regional c) High d) Supreme
60. The CAG is appointed by the president of India on the advice of
 a) President b) Chief Justice c) Speaker d) Council of Ministers
61. Who/which of the following is the custodian of the constitution of India?
 a) President of India b) Prime Minister of India
 c) Loka Sabha secretariat d) Supreme Court of India
62. The Governor shall hold office for a period of 05 years, subject to _____
 a) Pleasure of CM b) Pleasure of Chief Justice
 c) Pleasure of central ministers d) Pleasure of President
63. Article 164 states that _____ shall be appointed by the governors.
 a) KPSC president b) Aditor general
 c) Chief justice of High Court d) Chief ministers
64. In India, the Advocate general is a legal advisor to the
 a) Central Government b) State Government
 c) PM d) CM
65. At the state level, bills are divided into _____ categories
 a) 01 b) 02 c) 03 d) 04



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66. Who is the chief patron of NALGA (National Legal Service Authority)?
a) President
b) Vice President
c) Prime Minister
d) Chief Justice of India
67. Article 326 of the constitution prescribes for elections to the lokasabha and legislative assemblies
a) Universal Adult Franchise
b) Voting powers of Foreigners
c) Not vote in the elections
d) Removal of name from the voters list.
68. The election commission is a _____ members body
a) 02
b) 03
c) 05
d) 09
69. _____ ensures free and fair elections in the country (during elections time) from the date of announcement.
a) Moral code of conduct
b) More rules to vote
c) Constitution
d) Supreme Court to vote
70. What is considered as an alternative to an earlier procedure to reject all Candidates-section 49(0), Conduct of Election Rules, 1961?
a) VVPT
b) MCC
c) NOTA
d) NLSA
71. Right to vote in Lokasabha and state assembly elections is a _____ right
a) Constitutional
b) Statutory
c) Moral
d) Fundamental
72. Who is responsible for proper conduct of elections at a polling booth? And he/she is appointed by district election officer?
a) Polling officer
b) Returning officer
c) Tahasildhar
d) Presiding officer
73. 73rd Amendment Act, 1992 provides information about _____ bodies and added part IX and 11th schedule.
a) Rural local
b) Urban local
c) Municipalities
d) BBMP
74. Parliament approves National Emergency for period of _____ months. And it is required to approve emergency within a month by special majority.
a) 03 Months
b) 06 Months
c) 01 year and 06 months
d) 05 years and 06 months
75. Under article 360, when the president is satisfied that either financial stability of India or credit of India or any part of its territory is under threat, president can proclaim emergency.
a) National Emergency
b) States Emergency
c) President Rules Emergency
d) Financial Emergency
76. What is the minimum age for contesting in the elections of panchayaths?
a) 18 years
b) 21 years
c) 25 years
d) 30 years
77. 97th Amendment Act provided constitutional status to
a) Rural Panchayath system
b) Town Municipal Councils
c) CO-operative societies
d) Zilla panchayaths



78. Planning is defined as the process of
 a) Organizing
 b) Management
 c) Forecasting future problems
 d) Objective
79. The process of implementing the objective into actual practice becomes the executive
 a) Function of workers
 b) Function of Management
 c) function of unions
 d) Labours
80. One of the characteristics of profession is
 a) It gives scope to exercise one's skill
 b) It gives monopoly on service
 c) It provides opportunity to help the poor and needy
 d) It demands high standard of honesty
81. Engineering Ethics is _____
 a) A macro ethics
 b) Business ethics
 c) A preventive ethics
 d) A code of scientific rules based on ethics
82. Conflict of Interest may be _____
 a) False
 b) Imaginary
 c) Created
 d) Potential
83. Good work means _____
 a) Superior work done with great care and skill
 b) Responsible work
 c) Work above and beyond the call of duty
 d) Work involving high risk
84. The code of ethics can be taken as guidelines by Engineers to _____
 a) Overcome the work pressure
 b) Resolve the conflicts
 c) Formulate the problem
 d) Escape from the Responsibility
85. This is not dishonesty in Engineering.
 a) Trimming
 b) Blending
 c) Negligently
 d) Intentionality
86. The formula of MTR Sambar Masala in an example of
 a) Patent
 b) Trademark
 c) Copyright
 d) Trade Secret
87. Corrupt professional judgement leads to _____
 a) Integrity in R and D
 b) Reliability
 c) Conflict of Interest
 d) None of these
88. Which of the following is not preserved as an Intellectual property?
 a) Trade Secret
 b) Government Regulations
 c) Formulae
 d) Patents
89. These are not trade secrets
 a) Formulas
 b) Principles
 c) Patterns
 d) Devices



18CPC39

90. Which of the following is not a type of cyber crime?
a) Data theft
b) Forgery
c) Damage to data and systems
d) Installing Antivirus for protection
91. Which of the following is not a type of peer-to-peer cyber-crime?
a) Phishing
b) Injecting Trojans to a target victim
c) MiTM
d) Credit card details leak in deep web
92. All of the following are examples of real security and privacy threats except:
a) Hackers
b) Virus
c) Spam
d) Worm
93. Unsolicited commercial email is known as _____
a) Spam
b) Malware
c) Virus
d) Spyware
94. Which of the following is a class of computer threat?
a) Phishing
b) Soliciting
c) DoS attacks
d) Stalking
95. The way of manipulating data into information is called as
a) Storing
b) Processing
c) Deletion
d) Organizing
96. Pharming is also known as:
a) Black hat
b) Web Jacking
c) Crackers
d) None of them
97. When a person is harassed repeatedly by being followed, called or be written to he/she is target of
a) Bullying
b) Stalking
c) Identity theft
d) Phishing
98. Which of the following is not an external threat to a computer or a computer networks?
a) Ignorance
b) Trojan horses
c) Adware
d) Crackers
99. Firewall is a type of _____
a) Virus
b) Security threat
c) Worm
d) None of the above
100. Viruses are _____
a) Man Made
b) Naturally occur
c) Machine made
d) All of the above

* * * * *

CV

CBCS SCHEME



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17MAT41

Fourth Semester B.E. Degree Examination, Aug./Sept.2020 Engineering Mathematics - IV

Time: 3 hrs.

Max. Marks: 100

Note:1) Answer any FIVE full questions, choosing ONE full question from each module.
2) Use of Statistical tables allowed.

Module-1

- 1 a. Use Taylor's series to obtain approximate value of y at $x = 0.1$ for the differential equation $\frac{dy}{dx} = 2y + 3e^x$, $y(0) = 0$. (06 Marks)
- b. Apply Runge Kutta method of fourth order to find an approximate value of y when $x = 0.2$ for the equation $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$ taking $h = 0.2$. (07 Marks)
- c. Using Milne's predictor - corrector method, find y when $x = 0.8$ given $\frac{dy}{dx} = x - y^2$, $y(0) = 0$, $y(0.2) = 0.02$, $y(0.4) = 0.0795$, $y(0.6) = 0.1762$. (07 Marks)

OR

- 2 a. Given that $\frac{dy}{dx} = \log(x + y)$ and $y(1) = 2$, then find $y(1.2)$ in step of 0.2 using modified Euler's method carry out two iterations. (06 Marks)
- b. Using fourth order Runge-Kutta method to find y at $x = 0.2$ equation given that $\frac{dy}{dx} = x + y$, $y(0) = 1$ and $h = 0.2$. (07 Marks)
- c. Given $\frac{dy}{dx} = x^2(1 + y)$ and $y(1) = 1$, $y(1.1) = 1.283$, $y(1.2) = 1.548$, $y(1.3) = 1.979$. Evaluate $y(1.4)$ by Adam's-Bashforth predictor-corrector method. (07 Marks)

Module-2

- 3 a. Using Runge-Kutta method, solve $\frac{d^2y}{dx^2} = x \frac{dy}{dx} - y^2$ for $x = 0.2$, correct to three decimal places, with initial conditions $y(0) = 1$, $y'(0) = 0$. (06 Marks)
- b. If α and β are two distinct roots of $J_n(x) = 0$, then $\int_0^1 x J_n(\alpha x) J_n(\beta x) dx = 0$ if $\alpha \neq \beta$. (07 Marks)
- c. Express $f(x) = 3x^3 - x^2 + 5x - 2$ in terms of Legendre polynomials. (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



OR

- 4 a. Apply Milne's predictor-corrector method to compute $y(0.4)$ given the differential equation $\frac{d^2y}{dx^2} = 1 + \frac{dy}{dx}$ and the following initial values:
 $y(0) = 1, y(0.1) = 1.1103, y(0.2) = 1.2427, y(0.3) = 1.399$
 $y'(0) = 1, y'(0.1) = 1.2103, y'(0.2) = 1.4427, y'(0.3) = 1.699$ (06 Marks)
- b. With usual notation, show that
 $J_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \sin x$ (07 Marks)
- c. With usual notation, derive the Rodrigue's formula $P_n(x) = \frac{1}{(2^n)n!} \frac{d^n}{dx^n} (x^2 - 1)^n$. (07 Marks)

Module-3

- 5 a. Find the bilinear transformation which map the points $z = 0, 1, \infty$ into the points $w = -5, -1, 3$ respectively. (06 Marks)
- b. Derive Cauchy-Riemann equations in Cartesian form. (07 Marks)
- c. Evaluate $\int_C \frac{z^2}{(z-1)^2(z+2)} dz$ where $C: |z| = 2.5$ by residue theorem. (07 Marks)

OR

- 6 a. If $f(z)$ is a regular function of z , prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4|f'(z)|^2$. (06 Marks)
- b. Discuss the transformation $W = Z^2$. (07 Marks)
- c. Evaluate $\int_C \frac{e^{2z}}{(z+1)(z+2)} dz$, where C is the circle $|z| = 3$, using Cauchy residue theorem. (07 Marks)

Module-4

- 7 a. The probability density function of a variate x given by the following table:

| | | | | | | | |
|------|----|----|----|----|----|----|---|
| X | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| P(X) | K | 2K | 3K | 4K | 3K | 2K | K |

Find the value of K , mean and variance. (06 Marks)

- b. In a test on 2000 electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hours and S.D. of 60 hours. Estimate the number of bulbs likely to burn for, (i) more than 2150 hours, (ii) less than 1950 hours, (iii) more than 1920 hours and but less than 2160 hours.
 Given : $A(0 < z < 1.83) = 0.4664$, $A(0 < z < 1.33) = 0.4082$ and $A(0 < z < 2) = 0.4772$ (07 Marks)

- c. A joint probability distribution is given by the following table:

| | | | | |
|---|---|-----|-----|-----|
| | Y | -3 | 2 | 4 |
| X | | | | |
| 1 | | 0.1 | 0.2 | 0.2 |
| 3 | | 0.3 | 0.1 | 0.1 |

Determine the marginal probability distributions of X and Y . Also find $\text{COV}(X, Y)$. (07 Marks)



17MAT41

OR

- 8 a. Derive mean and variance of the Poisson distribution. (06 Marks)
 b. In a certain town the duration of a shower is exponentially distributed within mean 5 minute. What is the probability that a shower will last for
 (i) less than 10 minutes (ii) 10 minutes or more
 (iii) between 10 and 12 minutes. (07 Marks)
 c. Given,

| | | | | |
|-------|---------------|---------------|---------------|---------------|
| Y \ X | 0 | 1 | 2 | 3 |
| 0 | 0 | $\frac{1}{8}$ | $\frac{1}{4}$ | $\frac{1}{8}$ |
| 1 | $\frac{1}{8}$ | $\frac{1}{4}$ | $\frac{1}{8}$ | 0 |

- (i) Find Marginal distribution of X and Y.
 (ii) Find $E(X)$, $E(Y)$ and $E(XY)$. (07 Marks)

Module-5

- 9 a. A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased at 5% level of significance. (06 Marks)
 b. Five dice were thrown 96 times and number 1, 2 or 3 appearing on the face of the dice follows the frequency distribution as follows:

| | | | | | | |
|---------------------------------|---|----|----|----|---|---|
| No. of dice showing 1, 2 or 3 : | 5 | 4 | 3 | 2 | 1 | 0 |
| Frequency : | 7 | 19 | 35 | 24 | 8 | 3 |

- Test the hypothesis that the data follow a binomial distribution at 5% level of significance ($\chi^2_{0.05} = 11.07$ for d.f is 5). (07 Marks)
 c. A student's study habits are as follows:
 If he studies one night, he is 70% sure not to study the next night. On the other hand if he does not study one night he is 60% sure not to study the next night. In the long run how often does he study? (07 Marks)

OR

- 10 a. If $p = \begin{pmatrix} 0 & \frac{2}{3} & \frac{1}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} & 0 \end{pmatrix}$, find the fixed probabilities vector. (06 Marks)

- b. A random sample of 10 boys had the following I.Q's : 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Does this supports the hypothesis that the population mean of I.Q's is 100 at 5% level of significance? ($t_{0.05} = 2.262$ for 9 d.f) (07 Marks)
 c. Explain : (i) Transient state (ii) Absorbing state (iii) Recurrent state. (07 Marks)

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17MATDIP41

Fourth Semester B.E. Degree Examination, Aug./Sept. 2020

Additional Mathematics – II

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & -1 \\ 2 & -1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$. (07 Marks)
- b. Find the inverse of the matrix $\begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$ using Cayley-Hamilton theorem. (07 Marks)
- c. Find the Eigen values of the matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$. (06 Marks)

OR

- 2 a. Solve the system of equation by Gauss elimination method,
 $2x + y + 4z = 12$
 $4x + 11y - z = 33$
 $8x - 3y + 2z = 20$ (07 Marks)
- b. Using Cayley-Hamilton theorem find A^{-1} , given
 $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$. (07 Marks)
- c. Find the rank of the matrix by reducing in to row echelon form, given
 $A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$. (06 Marks)

Module-2

- 3 a. Solve by method of undetermined co-efficient $y'' - 4y' + 4y = e^x$. (07 Marks)
- b. Solve $\frac{d^3y}{dx^3} - 2\frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 8y = 0$. (07 Marks)
- c. Solve $y'' + 2y' + y = 2x$. (06 Marks)

OR

- 4 a. Solve $\frac{d^2y}{dx^2} + y = \sec x \tan x$ by method of variation of parameter. (07 Marks)
- b. Solve $y'' - 4y' + 13y = \cos 2x$. (07 Marks)
- c. Solve $6\frac{d^2y}{dx^2} + 17\frac{dy}{dx} + 12y = e^{-x}$. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Express the following function into unit step function and hence find $L[f(t)]$ given
- $$f(t) = \begin{cases} t, & 0 < t < 4 \\ 5, & t > 4 \end{cases} \quad (07 \text{ Marks})$$
- b. Find $L\left[\frac{1 - e^{-at}}{t}\right]$. (07 Marks)
- c. Find $L[t \cdot \cos at]$. (06 Marks)

OR

- 6 a. Find $L[\sin 5t \cdot \cos 2t]$. (07 Marks)
- b. Find $L[e^{-t} \cos^2 3t]$. (07 Marks)
- c. Find $L[\cos 3t \cdot \cos 2t \cdot \cos t]$. (06 Marks)

Module-4

- 7 a. Employ Laplace transform to solve the equation $y'' + 5y' + 6y = 5e^{2x}$ given $y(0) = 2$, $y'(0) = 1$. (07 Marks)
- b. Find $L^{-1}\left[\frac{1}{s(s+1)(s+2)(s+3)}\right]$. (07 Marks)
- c. Find $L^{-1}\left[\frac{s+5}{s^2-6s+13}\right]$. (06 Marks)

OR

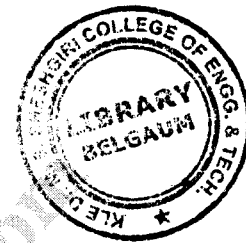
- 8 a. Using Laplace transforms solve $y'' + 4y' + 4y = e^{-t}$ given $y(0) = 0$, $y'(0) = 0$. (07 Marks)
- b. Find $L^{-1}\left[\log\left(\frac{s+a}{s+b}\right)\right]$. (07 Marks)
- c. Find $L^{-1}\left[\frac{2s-5}{4s^2+25}\right] + L^{-1}\left[\frac{8-6s}{16s^2+9}\right]$. (06 Marks)

Module-5

- 9 a. State and prove Baye's theorem. (07 Marks)
- b. A shooter can hit a target in 3 out of 4 shots and another shooter can hit the target in 2 out of 3 shots. Find the probability that the target is being hit.
- (i) When both of them try. (07 Marks)
- (ii) By only one shooter. (07 Marks)
- c. If A and B are any two mutually exclusive events of S, then show that $P(A \cup B) = P(A) + P(B) - P(A \cap B)$. (06 Marks)

OR

- 10 a. Three machines A, B and C produce respectively 60%, 30%, 10% of the total number of items of a factory. The percentages of defective out put of these machines are respectively 2%, 3% and 4%. An item is selected at random and is found defective. Find the probability that the item non produced by machine C. (07 Marks)
- b. Prove the following : (i) $P(\phi) = 0$ (ii) $P(\bar{A}) = 1 - P(A)$ (07 Marks)
- c. If A and B are events with $P(A \cup B) = \frac{7}{8}$, $P(A \cap B) = \frac{1}{4}$ and $P(\bar{A}) = \frac{5}{8}$ find $P(A)$, $P(B)$ and $P(A \cap \bar{B})$. (06 Marks)



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17CV42

Fourth Semester B.E. Degree Examination, Aug./Sept. 2020 Analysis of Determinate Structures

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data suitably.

Module-1

- 1 a. Define linear and nonlinear systems. (06 Marks)
 b. Distinguish between static indeterminacy and kinematic indeterminacy. (06 Marks)
 c. Determine static and kinematic indeterminacy for the following structures.



Fig Q1(c) - (i)

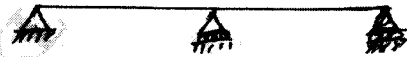


Fig Q1(c) - (ii)

(08 Marks)

OR

- 2 a. What are the assumptions made in the analysis of trusses? (04 Marks)
 b. Distinguish perfect and imperfect frames. (04 Marks)
 c. Find the forces in all members of truss shown in Fig Q2(c).

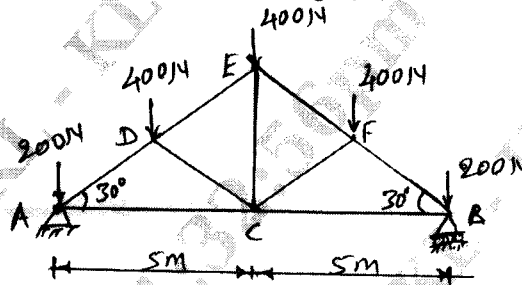


Fig Q2(c)

(12 Marks)

Module-2

- 3 a. State the moment area theorems. (04 Marks)
 b. Find the slope and deflection at the free end of cantilever beam subjected to udl w/m on its entire length by moment area method. (06 Marks)
 c. For the cantilever beam shown in Fig Q3(c), compute the slope and deflection at the free end. Take $EI = 4 \times 10^{12} \text{ Nmm}^2$. Use Macaulay's method.

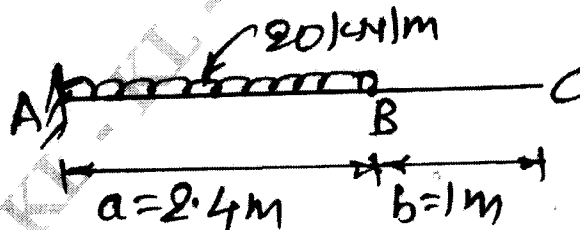


Fig Q3(c)

(10 Marks)



Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 4 a. Determine the slopes at the supports and deflection under the point load by conjugate beam method.

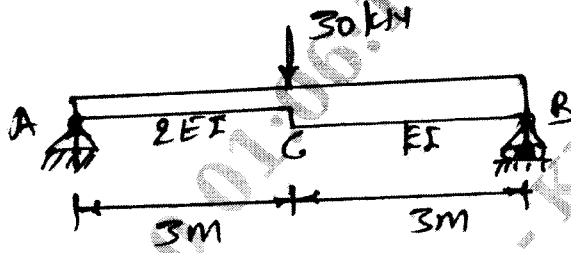


Fig Q4(a)

(10 Marks)

- b. Determine the deflection under the load points shown in Fig Q4(b) by Macanlay's method. Take $EI = 1 \times 10^{12} \text{ Nmm}^2$.

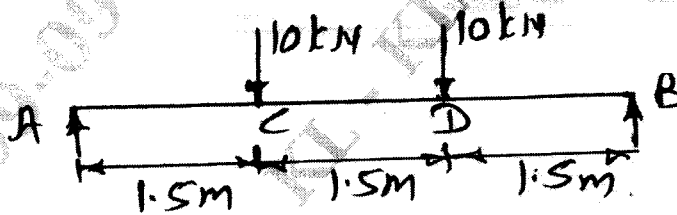


Fig Q4(b)

(10 Marks)

Module-3

- 5 a. Derive the strain energy stored in a beam due to bending. (06 Marks)
 b. Compute the deflection and rotation (slope) at the free end C of cantilever beam by unit load method. Shown in Fig Q5(b). Take $E = 200 \text{ GPa}$ $I = 8 \times 10^7 \text{ mm}^4$.

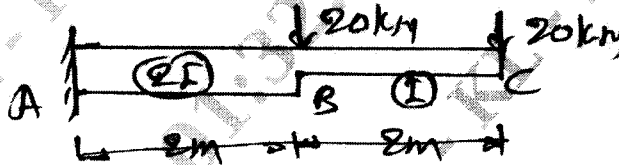


Fig Q5(b)

(14 Marks)

OR

- 6 a. Determine the horizontal deflection at D for the frame shown in Fig Q6(a) by Castiglione's theorem. Take EI constant. $E = 2 \times 10^5 \text{ N/mm}^2$, $I = 8 \times 10^8 \text{ mm}^4$.

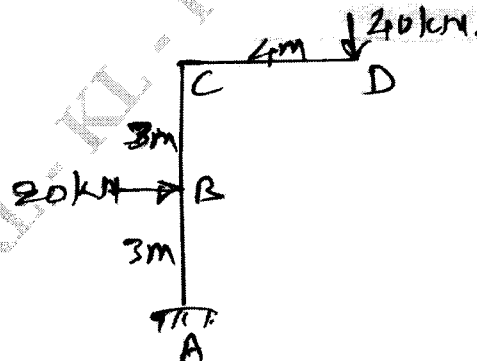


Fig Q6(a)

(11 Marks)

- b. Find the vertical deflection at joint C for the truss shown in Fig Q6(b) by unit load method c/s area of CD and DE are each 2500mm^2 and those of other are each 1250mm^2 . Take $E = 200\text{ kN/mm}^2$

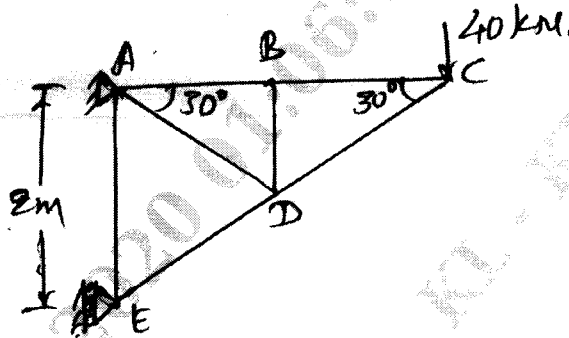


Fig Q6(b)

(09 Marks)

Module-4

- 7 A three hinged parabolic arch of span 18m and rise to crown hinge 3m carries a load of 120kN at the left quarter span. Find the BM, normal thrust and radial shear at section under the load. Also find maximum positive and negative b.m. in the arch. Sketch BMD. (20 Marks)

OR

- 8 A cable of span 120m and dip 10m carries a load of 6kN/m of horizontal span. Find the maximum tension in the cable and inclination of cable at the support. Find the forces transmitted to the supporting pier if the cable passes over smooth pulleys on top of pier. The anchor cable is at 30° to the horizontal. Determine the maximum bending moment for the pier if height of pier is 15m. (20 Marks)

Module-5

- 9 a. What are the uses of influence lines? (05 Marks)
 b. A simply supported beam has a span of 15m. A udl of 40kN/m and 5m long crosses the girder from left to right. Draw the influence line diagram for SF and BM at a section 6m from left end. Using these diagrams. Calculate maximum SF and BM at this section. Also determine the position and magnitude of absolute maximum BM in the beam. (15 Marks)

OR

- 10 A train of 5 wheel loads as shown in Fig Q10 crosses a simply supported beam of span 24m from left to right. Calculate the maximum positive and negative SF values at the centre of span and the absolute maximum B.M anywhere in the span.

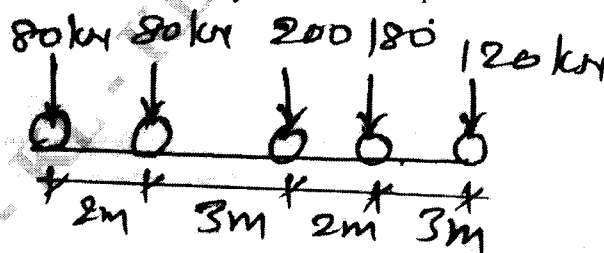
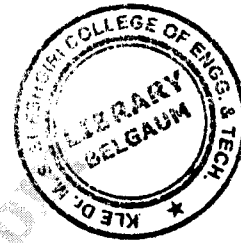


Fig Q10

(20 Marks)

CBCS SCHEME



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17CV43

Fourth Semester B.E. Degree Examination, Aug./Sept.2020 Applied Hydraulics

Time: 3 hrs.

Max. Marks: 100

**Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data if any suitably.**

Module-1

- 1 a. Differentiate between dimensionally homogeneous and non-homogeneous with an example each. (06 Marks)
- b. What is dimensional analysis? Mention its uses. (06 Marks)
- c. Capillary rise 'h' depends upon density 'ρ', acceleration due to gravity, 'g', surface tension, 'σ' and radius of tube, 'r'. Show by Buckingham π – theorem that,

$$\frac{h}{r} = \phi \left[\frac{\sigma}{\rho g r^2} \right]$$

(08 Marks)

OR

- 2 a. Explain Reynold's model law and give the areas where it is applied. (06 Marks)
- b. What are distorted and undistorted models? (04 Marks)
- c. The discharge and velocity of flow over the model of a spillway of a dam were measured to be 2.0 m³/s and 2.5 m/s respectively. If the model is built to a scale of 1:36, compute the velocity and discharge over its prototype. (10 Marks)

Module-2

- 3 a. Derive Chezy's equation for uniform flow in open channel and thereby deduce Manning's formula for velocity in open channel. (08 Marks)
- b. A circular open channel laid to a gradient of 1:9000 carries a discharge of 0.40 m³/s. If the depth of flow is 1.25 times the radius of channel, find the diameter of the channel. Assume roughness coefficient for channel surface as 0.015. (12 Marks)

OR

- 4 a. How do you define specific energy of a flowing? Draw specific energy curve and explain various parameters. (06 Marks)
- b. Enumerate the characteristics of critical flow through open channels. (04 Marks)
- c. The discharge in a 4.0 m wide rectangular channel at 1.0m depth of flow is 4.0 m³/s. Compute (i) Specific energy for 1.0m depth of flow (ii) Critical depth (iii) Alternate depth to 1.0m. (10 Marks)

Module-3

- 5 a. Define hydraulic jump in an open channel flow. Give its applications. (06 Marks)
- b. Prove that the critical depth (y_c) and the alternate depths y_1 and y_2 are related by the expression, $y_c^3 = \frac{2y_1^2 y_2^2}{(y_1 + y_2)}$, in a rectangular open channel. (06 Marks)
- c. In a rectangular channel of width 6.0m, the sluice gate discharges with a velocity of 5.0 m/s at a depth of 0.40m. Determine whether a hydraulic jump will occur. Also find (i) Jump height (ii) Energy lost per kg of water and (iii) Power lost in the hydraulic jump. (08 Marks)

1 of 2

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OR

- 6 a. Explain classification of surface profiles with neat sketches. (10 Marks)
 b. A rectangular channel 10m wide carries a discharge of $40 \text{ m}^3/\text{s}$. If at a section in this channel, the depth of flow is 1.50m, how far upstream or downstream from this section will the depth be 2.0m. Take channel bed slope as 0.00009 and Manning's $N = 0.017$. (10 Marks)

Module-4

- 7 a. Derive an expression for the force exerted by a jet striking a moving symmetrical curved vane striking at the center and hence how that the maximum efficiency of this jet-vane system is limited to $16/27$. (10 Marks)
 b. A jet water moving at 20 m/s impinges on a symmetrical curved vane so shaped to deflect the jet through 120° . If the vane is moving at 5.0 m/s , find the angle of jet so that there is no shock at the inlet. Also determine the absolute velocity at the exit in magnitude and direction and the work done per unit weight of water. (10 Marks)

OR

- 8 a. Draw a general layout of a hydro-electric power plant and give the function of each of the components in brief. (10 Marks)
 b. A Pelton wheel running at a speed of 600 rpm under a head of 820 m develops 13200 kW power. If the coefficient of jet $C_v = 0.98$, Speed ratio, $\phi = 0.46$ and jet diameter is $1/16$ of wheel diameter, calculate (i) Pitch circle diameter (ii) Diameter of the jet (iii) Quantity of water supplied to the wheel and (iv) the number of jets required. Assume overall efficiency as 85% . (10 Marks)

Module-5

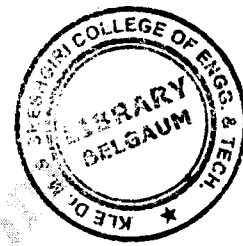
- 9 a. Draw a neat sketch of a Francis turbine and explain its components. (04 Marks)
 b. What is a draft tube? Explain its function in a reaction turbine. (06 Marks)
 c. A Kaplan turbine runner is to be designed to develop 9100 kW power. The net available head is 5.6 m . If the speed ratio = 2 , flow ratio = 0.68 , overall efficiency = 86% and the diameter of boss is equal to $1/3^{\text{rd}}$ the diameter of runner, find the diameter of runner, the speed and specific speed of turbine. (10 Marks)

OR

- 10 a. Explain various heads and efficiencies of centrifugal pumps. (10 Marks)
 b. A centrifugal pump with radial inflow delivers 0.08 cumecs of water against a total head of 40 m . If the outer diameter of the impeller is 30 cm and its width at the outer periphery is 1.25 cm , find the blade angle at exit. The speed of the pump is 1500 rpm and its manometric efficiency is 80% . (10 Marks)

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CBCS SCHEME



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17CV/CT44

Fourth Semester B.E. Degree Examination, Aug./Sept.2020 Concrete Technology

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS – 10262 mix design code is allowed.

Module-1

- 1 a. Define cement. Tabulates the oxides content. (04 Marks)
b. Explain the sulphate resisting cement and Portland slag cement. (06 Marks)
c. Explain the particle size distribution test of sand. (04 Marks)
d. Explain the tests flakiness and elongation index for coarse aggregate. (06 Marks)

OR

- 2 a. Explain the manufacture of cement in dry process by flow chart. (05 Marks)
b. Mention the field tests on cement. (05 Marks)
c. Explain the tests specific gravity and crushing value for coarse aggregate. (06 Marks)
d. What are the factor affects on size, shape and texture of aggregate. (04 Marks)

Module-2

- 3 a. Name the tests conducted on workability of concrete and explain any one test. (08 Marks)
b. Explain the process of manufacturing of concrete with flow charts. (12 Marks)

OR

- 4 a. What are the factors affecting workability. (08 Marks)
b. What is segregation and bleeding? How prevent in the concrete mix. (12 Marks)

Module-3

- 5 a. What is shrinkage of concrete? Explain drying shrinkage. (08 Marks)
b. Explain the penetration test according to IS456 codal provision. (04 Marks)
c. What are the factors improves the durability of concrete. (08 Marks)

OR

- 6 a. Define creep, what are the factors affecting the creep of concrete. (10 Marks)
b. Explain maturity concept. (04 Marks)
c. Explain the testing of hardened concrete. (06 Marks)

Module-4

- 7 a. Write a step by step procedure for concrete mix design according to IS code provision. (06 Marks)
b. Design a M30 grade concrete mix having a specific gravity of fine aggregate is 2.62 and grading zone I. Use IS : 10262 Indian standard recommended guidelines. Assume all other data suitable. (14 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

1 of 2

OR

- 8 a. What are the data require for mix proportioning of concrete. (04 Marks)
- b. Design a concrete mix design for a M40 grade using GGBS according to IS – 10262 code provision. Use following data :
- | | |
|--------------------------------|-----------------------------------|
| a) Type of cement | – OPC 43 grade |
| b) Type of mineral admixture | – GGBS |
| c) Maximum nominal size of A99 | – 20mm |
| d) Exposure condition | – Severe |
| e) Workability | – 120mm (slump) |
| f) Method of concrete placing | – Pumping |
| g) Degree of supervision | – Good |
| h) Maximum cement | – As per IS 456 |
| i) Type of aggregate | – Crushed stone angular aggregate |
| j) Chemical admixture type | – Super plasticizer |
- Assume other data wherever necessary. (16 Marks)

Module-5

- 9 a. Explain the property of light weight concrete. (06 Marks)
- b. What are the different types of fibers used in FRC? (08 Marks)
- c. What are the factors on which property of RMC depends? (06 Marks)

OR

- 10 a. What are the properties of FRC? (04 Marks)
- b. Name the different test conducted on self compacting concrete and explain any four. (12 Marks)
- c. Write the application of light weight concrete mix. (04 Marks)

CBCGS SCHEME



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17CV45

Fourth Semester B.E. Degree Examination, Aug./Sept.2020 Basic Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define : (i) Void Ratio (ii) Porosity (iii) Air content (iv) Degree of saturation (v) Water content. (05 Marks)
- b. Starting from 3-phase diagram, with usual notation prove that
- $$r_d = \frac{(1 - n_a)Gr_w}{1 + GW} \quad (07 \text{ Marks})$$
- c. A sample of soil has a volume of 1000 C.C and a weight of 17.5N. The specific gravity of soil solid 2.52. If dryout weight is 15.8 kN/m³, determine the water content, void ratio, submerged unit weight and degree of saturation. (08 Marks)

OR

- 2 a. Briefly explain consistency limit and indices and explain activity of clay. (08 Marks)
- b. The sample of sand above water table was found to have natural water content of 15% and unit weight of 18.484 kN/m³. Laboratory test on a dry sample indicated $e_{min} = 0.5$ and $e_{max} = 0.85$ for densest and loosest state respectively. Compute the degree of saturation and relative density. Assume $G = 2.65$. (06 Marks)
- c. Explain various correction factors in hydrometer analysis. (06 Marks)

Module-2

- 3 a. Explain the concept of electrical diffuse double layer. (06 Marks)
- b. Mention three different clay mineral commonly found in soil. Explain any one with their structures. (06 Marks)
- c. Differentiate between :
- (i) Primary and secondary valency forces
- (ii) Flocculated structures and dispersed structures. (08 Marks)

OR

- 4 a. State and explain briefly the factors affecting compaction of soil. (06 Marks)
- b. Calculate the compactive energies applied for standard and modified proctor test. (06 Marks)
- c. Following are the observations of compaction test:

| | | | | | | |
|------------------------|-------|-------|-------|-------|-------|-------|
| Water content % | 7.7 | 11.5 | 14.6 | 17.5 | 19.5 | 21.2 |
| Weight of wet soil (N) | 16.67 | 18.54 | 19.92 | 19.52 | 19.23 | 18.83 |

Volume of compaction mould = 950 cc

$G = 2.65$

- (i) Draw compaction curve (ii) Report the MOD and OMC (08 Marks)
- (iii) Draw 100% saturation line.

Module-3

- 5 a. With a neat sketch, explain the method of locating phreatic line for homogeneous earth dam with horizontal filter. (06 Marks)

1 of 2



- b. Explain the following terms:
 (i) total stress (ii) Neutral stress (iii) effective stress (iv) Quick sand condition. (08 Marks)
- c. A 1.25m layer of soil, $G = 2.65$ and porosity = 35% is subject to an upward seepage head of 1.85m. What depth of coarse sand would be required above the soil to provide a factor of safety of 2.0 against piping assuming that the coarse sand has same porosity and specific gravity as soil and that there is negligible headloss in the sand. (06 Marks)

OR

- 6 a. Briefly explain the factors affecting the permeability of soils. (10 Marks)
 b. Derive an expression for coefficient of permeability used in variable head permeability test. (10 Marks)

Module-4

- 7 a. What is a pre-consolidation pressure? Explain the Casagrande's method of determining the pre-consolidation pressure from laboratory consolidation test. (08 Marks)
 b. Write short note on pore water pressure in soils. (06 Marks)
 c. A soil sample 20mm thick takes 20 minutes to reach 20% of consolidation. Find the time taken by for a clay layer 6m thick to reach 40% consolidation. Assume double drainage in both the cases. (06 Marks)

OR

- 8 a. With spring analogy, explain consolidation. (10 Marks)
 b. A saturated soil has a compression index of 0.25. Its void ratio at a stress of 10 kPa is 2.02 and its permeability is 3.4×10^{-7} mm/s Compute.
 (i) Change in void ratio if stress is increased to 19 kN/m²
 (ii) Settlement in (i) if the soil stratum is 5m thick
 (iii) Time required for 40% consolidation if drainage is one way. (10 Marks)

Module-5

- 9 a. List the merit and demerits of triaxial shear test over Direct Shear test. (08 Marks)
 b. Explain the classification of shear test based on drainage condition. (06 Marks)
 c. In an unconfined compression test, a sample of sandy clay 8 cm long and 4 cm diameter fails under a load of 120 N at 10% strain. Compute the shearing resistance taking into account the effect of change in cross-section of the sample. (06 Marks)

OR

- 10 a. Explain Mohr-Coulomb failure theory of soil. (06 Marks)
 b. What are factors affecting the shear strength of soil. (06 Marks)
 c. In a shear test conducted on a river sand, the following result were obtained.

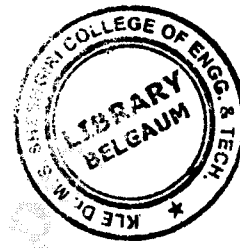
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|------------------|----|-----|-----|-----|-----|-----|
| Normal force (N) | 80 | 160 | 240 | 320 | 400 | 480 |
| Shear force (N) | 50 | 101 | 149 | 201 | 248 | 302 |

Determine 'C' and ' ϕ '.

(08 Marks)

* * * * *

CBCS SCHEME



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17CV46

Fourth Semester B.E. Degree Examination, Aug./Sept.2020 Advanced Surveying

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List the different methods of setting out simple circular curve. Explain the Rankine's method of setting out simple circular curve. (08 Marks)
- b. Two tangents intersect at chainage of 1190 mt, the deflection angle being 36° . Compute all the data necessary to set out a simple circular curve of radius 300 mt by deflection angle method. Take peg interval as 30 mt. Tabulate the results. (12 Marks)

OR

- 2 a. What is a Transition curve? List the function and essential requirements of an ideal transition curve. (06 Marks)
- b. Two straight with a total deflection angle of 72° are to be connected by a compound curve of two branches of equal length. The Radius of the first branch is 300 mt and that of the second is 400 mt. Chainage of intersection point is 1500 mt. Calculate the chainages of tangent points and that of point of compound curvature. (07 Marks)
- c. Two parallel railway lines are to be connected by a reverse curve of different radii. If the lines are 10 mt apart and the maximum distance between the tangent points measured parallel to the straight is 45 mt. Calculate the radius of the second branch, if that of first branch is 65 mt. Also calculate the length of both the branches. (07 Marks)

Module-2

- 3 a. Mention the points to be considered in the selection of triangulation stations. (08 Marks)
- b. From an eccentric station, S, 12.25 mt to the west of the main station B, the following angles were measured.

$$\angle BSC = 76^\circ 25' 32'' ; \quad \angle CSA = 54^\circ 32' 20''$$

The station S and C are to the opposite sides at the line AB, calculate the correct angle ABC, if the lengths of AB and BC are 5276.5 and 4932.2 m respectively. (12 Marks)

OR

- 4 a. State and explain Laws of weights. (08 Marks)
- b. Find the most probable values of the angles, from the following given equations.

$$A = 42^\circ 36' 28'' \quad \text{Weight 2}$$

$$B = 28^\circ 12' 42'' \quad \text{Weight 1}$$

$$C = 65^\circ 25' 16'' \quad \text{Weight 1}$$

$$A + B = 70^\circ 49' 14'' \quad \text{Weight 2}$$

$$B + C = 93^\circ 37' 55'' \quad \text{Weight 1}$$

(12 Marks)

Module-3

- 5 a. Define the following terms:
(i) Celestial sphere (ii) Vertical circle (iii) The sensible horizon (iv) Zenith and Nadir (08 Marks)

1 of 2

- b. Find the GMT corresponding to following LMT:
 (i) 9 h 40 m 12s A.M at a place in Longitude $42^{\circ} 36' W$
 (ii) 4 h 32 m 10s A.M at a place in Longitude $56^{\circ} 32' E$ (12 Marks)

OR

- 6 a. Define the following terms:
 (i) Celestial horizon (ii) The Altitude
 (iii) The hour angle (iv) The prime vertical. (08 Marks)
 b. The standard time meridian in India is $82^{\circ} 30' E$. If the standard time at any instant is 20 hours, 24 minutes, 6 seconds, find LMT for two places having longitudes.
 (i) $20^{\circ} E$ (ii) $20^{\circ} W$ (12 Marks)

Module-4

- 7 a. Define the following terms:
 (i) Vertical photograph
 (ii) Flying height
 (iii) Expose station
 (iv) Oblique photograph (08 Marks)
 b. A vertical photograph was taken at an altitude of 1200 mt above MSL. Determine the scale of the photograph for terrain lying at elevations of 80 meters and 300 meters, if the focal length of the camera is 15 cm (12 Marks)

OR

- 8 a. List the reasons for keeping overlap in photographs. (06 Marks)
 b. Describe how mosaic differ from a map. (04 Marks)
 c. A section line AB appears to be 10.16 cm on a photograph for which the focal length is 16 cm. The corresponding line measures 2.54 cm on a map which is to a scale of $\frac{1}{50,000}$. The terrain has an average elevation of 200 m above MSL. Calculate the flying altitude at the aircraft, above MSL, when the photograph was taken. (10 Marks)

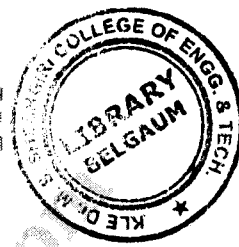
Module-5

- 9 a. What is GIS? List the applications of GIS in Civil Engineering. (10 Marks)
 b. Explain the basic principle of GPS and its applications in civil engineering. (10 Marks)

OR

- 10 a. What is GPS? Explain the working principles of GPS and its uses in surveying. (10 Marks)
 b. Define Remote Sensing. Explain the stages of idealized Remote Sensing. (10 Marks)

* * * * *



CV

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17CV/CT51

Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Design of RC Structural Elements

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456:2000 and SP-16 is permitted.
3. Assume missing data if any suitably.*

Module-1

- 1 a. Explain the philosophy and principles of limit state design method. (08 Marks)
 b. What is stress block? Derive from fundamentals the expression for area of stress block $0.36f_{ck}$ and depth of center of compressive force from the extreme fiber in compression $0.42x_u$. (12 Marks)

OR

- 2 a. Explain the following:
 i) Characteristic load
 ii) Characteristic strength
 iii) Partial safety factor. (06 Marks)
 b. A rectangular section 200×450 mm is reinforced with 3 number 16mm diameter bars at an effective depth 420mm. The beam has 2 hanger bars of 12mm diameter. With effective span 5m. The beam support a load of 10kN/m. Calculate short term deflection and long term deflection using M₂₀ grade concrete and Fe415 grade steel. (14 Marks)

Module-2

- 3 a. Define singly and doubly reinforced beams. List the situations when they are adopted. (06 Marks)
 b. A rectangular section of effective size 230mm \times 500mm is used as simply supported beam for an effective span of 6.3m. What is the maximum total udl allowed on the beam if maximum percentage of steel is provided on tension side. Use M₂₅ grade concrete and Fe415 steel. Take effective cover = 50mm. (14 Marks)

OR

- 4 a. A rectangular section of size 250mm \times 500mm is reinforced with 4 number 16mm diameter bars. With an effective cover 50mm and effective span 6m. Using M20 grade concrete and Fe415 steel calculate moment of resistance and central concentrated load that can be carried by beam in addition to its self weight. (12 Marks)
 b. An isolated T-beam, simply supported over a span of 6m has following dimensions: Width of flange 750mm, thickness of flange 125mm, overall depth 400mm, width of web 260mm, effective cover to tensile reinforcement 40mm. The beam is reinforced with 4 bars of 20mm diameter. Determine the moment of resistance if Fe415 bars are used. Take $\sigma_{cbc} = 5N/mm^2$ and $m = 19$. (08 Marks)

Module-3

5. A simply supported RC beam supports a service load of 8kN/m over an clear span 3m. Support width is 200mm. Using M20 grade concrete and Fe415 steel. Design the beam for flexure and shear. Sketch the reinforcement details. (20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



OR

- 6 A cantilever beam of span 4m carries a factored load 40kN/m. Take width of beam as 230mm. Design the beam for flexure and shear. Sketch the reinforcement details. Use M₂₀ grade concrete and Fe415 steel. (20 Marks)

Module-4

- 7 Design a cantilever Portico slab projecting 1.5m from the beam supporting a live load of 3kN/m². Adopt M₂₀ grade concrete and Fe415 steel. Sketch the reinforcement details. (20 Marks)

OR

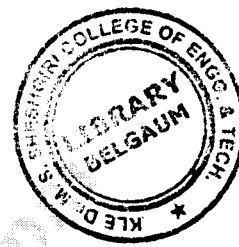
- 8 Design a dog legged stair case of a private building hall measuring 2.2m × 4.7m. Width of landing is 1.1m. The distance between floor to floor is 3.3m. Take rise = 150mm and thread = 270mm, weight of floor finish = 1kN/m². Adopt M₂₀ grade concrete and Fe415 steel take live load = 3kN/m². Assume wall thickness of 230mm which supports the stairs at the end of outer edges of landing slabs. Sketch the reinforcement details. (20 Marks)

Module-5

- 9 Design an RCC column 400mm × 400mm to carry on ultimate load of 1000kN at an eccentricity of 160mm. Using M₂₅ grade concrete and Fe415 steel. Sketch the reinforcement details. (20 Marks)

OR

- 10 A square column of 400mm sides carries a load of 900kN. Design the footing for an SBC of soil 100kN/m². Show the check for one way shear, two way shear and bond strength. Adopt M₂₀ grade concrete and Fe415 grade steel. Sketch the reinforcement details. (20 Marks)



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17CV52

Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 100

**Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume missing data suitably.**

Module-1

- 1 Analyze the continuous beam shown in Fig.Q.1 by slope deflection method BMD, SFD and elastic curve. (20 Marks)

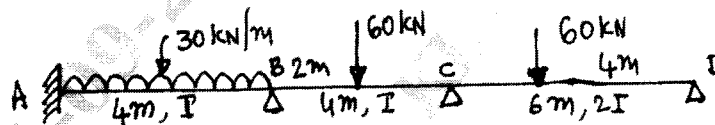


Fig.Q.1

OR

- 2 Analyze the Frame shown in Fig.Q.2 by slope deflection method. Draw BMD and elastic curve. (20 Marks)

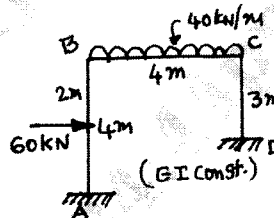


Fig.Q.2

Module-2

- 3 Analyze the continuous beam shown in Fig.Q.3. Using moment distribution method. Draw BMD, SFD and EC if support A yields by 0.002 radians in clockwise direction, support B sinks by 30mm and support 'C' sink by 20mm. Take $EI = 480 \text{ kN-m}^2$. (20 Marks)

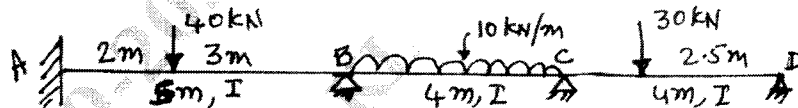


Fig.Q.3

OR

- 4 Analyze the frame shown in Fig.Q.4 by MD method and draw BMD and EC. (20 Marks)

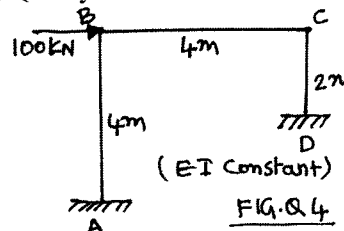


Fig.Q.4

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 Analyze the frame shown in Fig.Q.5 using Kani's method. Draw BMD and EC. (20 Marks)

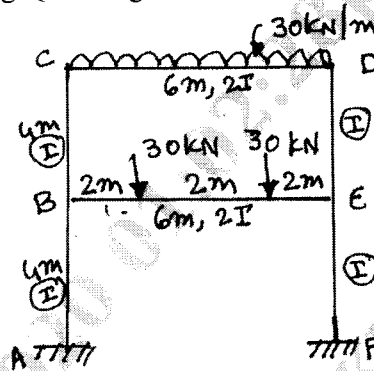


Fig.Q.5

OR

- 6 Analyze the frame shown in Fig.Q.6 by using Kani's method. Draw BMD. (20 Marks)

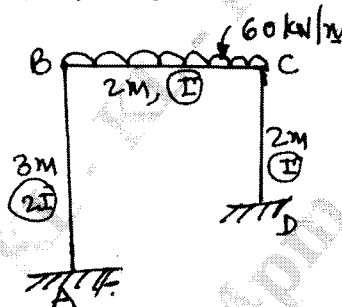


Fig.Q.6

Module-4

- 7 Analyze the continuous beam shown in Fig.Q.7 using flexibility matrix method. Draw BMD and SFD. (20 Marks)

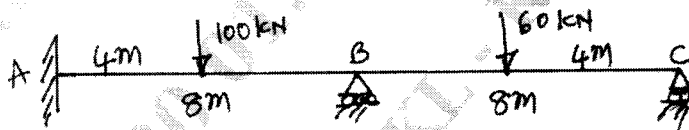


Fig.Q.7

OR

- 8 Analyze the frame shown in Fig.Q.8 by using flexibility matrix method. Draw BMD. (20 Marks)

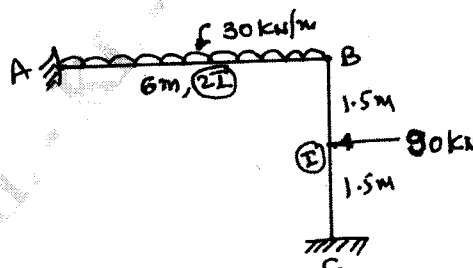


Fig.Q.8

Module-5

- 9 Analyze the truss shown in Fig.Q.9 using stiffness matrix method. If cross sectional areas of vertical member 300mm^2 and inclined members area 200mm^2 . Take $E = 2 \times 10^5 \text{N/mm}^2$.
(20 Marks)

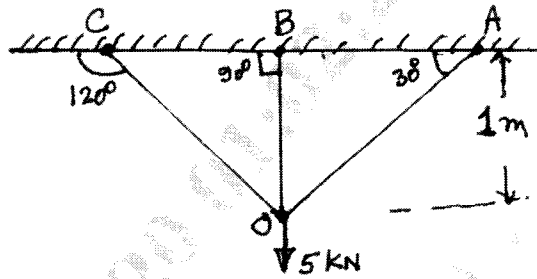


Fig.Q.9

OR

- 10 Analyze the Portal frame shown in Fig.Q.10 by using stiffness method. Draw BMD and EC.
(20 Marks)

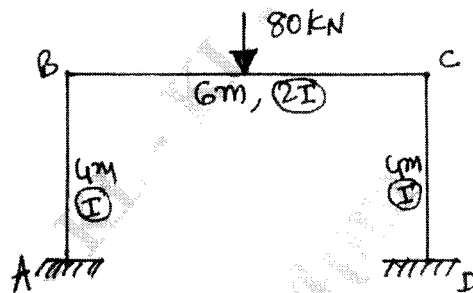


Fig.Q.10



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Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

Note : 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS 6403 is permitted.

Module-1

- 1 a. Discuss the necessity of sub soil exploration. Mention the stages involved in it. (06 Marks)
 b. Explain the method of Seismic Refraction method. (08 Marks)
 c. The field N value in a deposit of fully submerged fine sand was 40 at a depth of 6m. The average saturated unit weight of the soil is 19kN/m^3 . Calculate the corrected N value by applying corrections. (06 Marks)

OR

- 2 a. With the help of a neat sketch of soil sampler, define Area ratio , Inside clearance and outside clearance. State its permissible values for undisturbed sample. (08 Marks)
 b. What are the methods available for dewatering? Explain anyone method. (07 Marks)
 c. A soil sample was pushed into the soil for a depth of 600mm and length of the sample obtained was 590mm. What is Recovery ratio? What is the state of the sample? How can this be avoided? (05 Marks)

Module-2

- 3 a. Distinguish between Boussinesq's and Westergaard's theory of stress distribution. (06 Marks)
 b. Explain the construction and use of Newmark's chart for determining stress distribution. (08 Marks)
 c. A water tank is supported by a ring foundation having outer diameter of 10m and inner diameter of 7.5m. The ring foundation transmits uniform load intensity of 160 kN/m^2 . Compute the vertical stress induced at a depth of 4m, below the centre of ring foundation. Using i) Boussinesq's analysis ii) Westergaard's analysis. Take $\mu = 0$. (06 Marks)

OR

- 4 a. What are settlements? Explain the components of settlement and their determination. (08 Marks)
 b. Write a note on Pressure bulb. (04 Marks)
 c. A soft normally consolidated clay layer is 20m thick. The natural water content is 45%. The saturated unit weight is 20kN/m^3 . The grain specific gravity is 2.70 and liquid limit is 60%. The vertical stress increment at the centre of clay layer due to foundation load is 10kpa. The ground water level is at the surface of clay layer. Determine the settlement of foundation if the initial effective stress at the centre of the soil is 100kPa. Assume unit weight of water is 10kN/m^3 . (08 Marks)

Module-3

- 5 a. Differentiate between Rankine's and Coulomb's earth pressure theory. (06 Marks)
 b. Describe Rebhan's graphical method for active earth pressure calculation. (06 Marks)
 c. A retaining wall of 5.4m high, retains sand. In the loose state the sand has void ratio of 0.63 and $\phi = 27^\circ$, while in the dense state, the corresponding values of void ratio and ϕ are 0.36 and 45° respectively. Compare the values of active and passive earth pressure in both the states of soil. Assume $G = 2.64$, $\gamma_w = 10\text{kN/m}^3$. (08 Marks)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the causes for a slope failure and list the modes of finite slope failure. (06 Marks)
 b. With the help of sketch, explain Swedish slip circle method of stability analysis for cohesive soil. (06 Marks)
 c. A new canal is excavated to a depth of 5m below ground level, through a soil having the characteristics $C = 14\text{kN/m}^2$; $\phi = 15^\circ$; $e = 0.8$ and $G = 2.70$. The slope of banks is 1:1. Calculate the factor of safety with respect to cohesion when canal runs full. If the canal suddenly emptied completely what will be the factor of safety. Take $S_n = 0.083$ for submerged case ; $S_n = 0.122$ for Drawdown case. (08 Marks)

Module-4

- 7 a. Define the terms : i) Ultimate bearing capacity ii) Safe bearing capacity
 iii) Net ultimate bearing capacity iv) Allowable bearing capacity. (08 Marks)
 b. A footing 3m square carries a gross pressure of 350kN/m^2 at a depth of 1.2m in sand, saturated unit weight of sand is 20kN/m^3 and unit weight above the water table is 17kN/m^3 . The effective angle of friction is 30° and the bearing capacity factors for $\phi' = 30^\circ$ are $N_q = 22$, $N_\gamma = 20$. Determine the factor of safety with respect to shear failure for the following cases i) Water table is 5m below the ground level.
 ii) Water table is 1.2m below the ground level. (12 Marks)

OR

- 8 a. With the help of neat sketch, differentiate General shear failure and Local shear failure , Punching shear failure. (08 Marks)
 b. A strip footing 2m wide carries a load intensity of 400kN/m^2 at a depth of 1.2m in sand. The saturated unit weight of sand is 19.5kN/m^3 and unit weight above water table is 16.8kN/m^3 . The share strength parameters are $C = 0$; $\phi = 35^\circ$. Determine the factors of safety with respect to shear failure for the following cases of location of Ground water table.
 i) Water table is 4m below ground level ii) Water table is 1.2m below ground level
 iii) Water table is 2.5m below ground level. For $\phi = 35^\circ$ consider $N_q = 41.4$; $N_\gamma = 42.4$. (12 Marks)

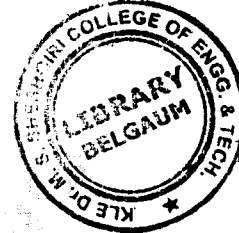
Module-5

- 9 a. What is Pile foundation? Explain the types of Pile foundation. (10 Marks)
 b. A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of piles were 30cm and 9m respectively. If the unconfined compression strength of the clay is 90kN/m^2 and the pile spacing is 90cm centre to centre, what is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75. (10 Marks)

OR

- 10 a. Which are the methods of finding load carrying capacity of pile? Explain any one method. (08 Marks)
 b. Write a note on Negative skin friction of Pile. (06 Marks)
 c. Define Under reamed piles : Under what circumstances it is employed and hence explain how the estimation of its design capacity is done. (06 Marks)

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**Fifth Semester B.E. Degree Examination, August 2020
(CIVIL ENGINEERING)**

COMPUTER AIDED BUILDING PLANNING AND DRAWING

Time: 3 Hours

Max. Marks: 100

- Note:** 1. Answer any *TWO* full questions as per INTERNAL CHOICE.
2. Assume any missing data suitably.

Q1. Prepare a working drawing for an isolated rectangular RCC column and footing has the following details:

Column size: (400 x 600) mm.

Size of footing: 2m x 3m of uniform thickness 450mm.

Depth of foundation below GL = 1.5m

Height of column to be shown above GL = 1.0m

Thickness of PCC bed in 1:3:6 = 75mm

Details of reinforcement:

Column: #8 - 16 ϕ as main bars with 2L - 8 ϕ @ 150 c/c lateral ties

Footing: Longer direction steel - 12 ϕ @ 130 c/c

Shorter direction steel - 12 ϕ @ 220 c/c.

(40 Marks)

OR

Q2. Draw a detailed longitudinal section, a cross section near the supports and a section at the middle of the span of a simply supported doubly reinforced beam for the following data:

Clear span = 5.4m

Bearing over the supports = 300mm

Size = 300 x 800 mm

Main reinforcement tensile: #7 - 25 ϕ . 4 straight and 3 bent up @ 1400mm from Support.

Compression reinforcement: #4 - 25 ϕ .

Spacer bars = 25 ϕ

Side face reinforcement: #2 - 12 ϕ

Shear reinforcement: 2L - 12 ϕ @ 150 c/c for a distance of 1.5m from the support and

2L - 12 ϕ @ 300 c/c for remaining middle portion.

(40 Marks)

Q3. The line diagram of a residential building is given in Fig Q3. Draw to scale the following. Given main wall 230 mm thick, partition wall = 100 mm, floor height = 3.0 m

- Plan at sill.
- Front Elevation.
- Section along A-A.
- Schedule of openings.

(60 Marks)

OR

Q4. The line diagram of a Hostel building is given in Fig Q4. Draw to scale the following.

- Plan at sill.
- Front Elevation.
- Section along A-A.
- Schedule of openings.

(60 Marks)

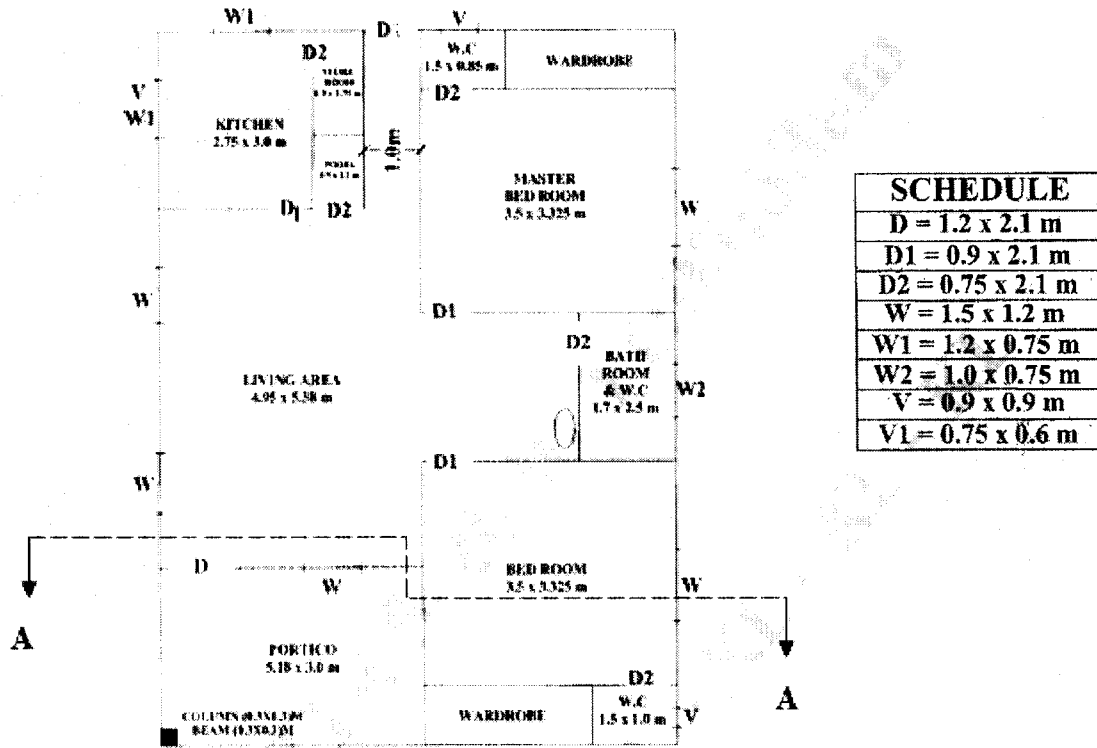


Fig Q3

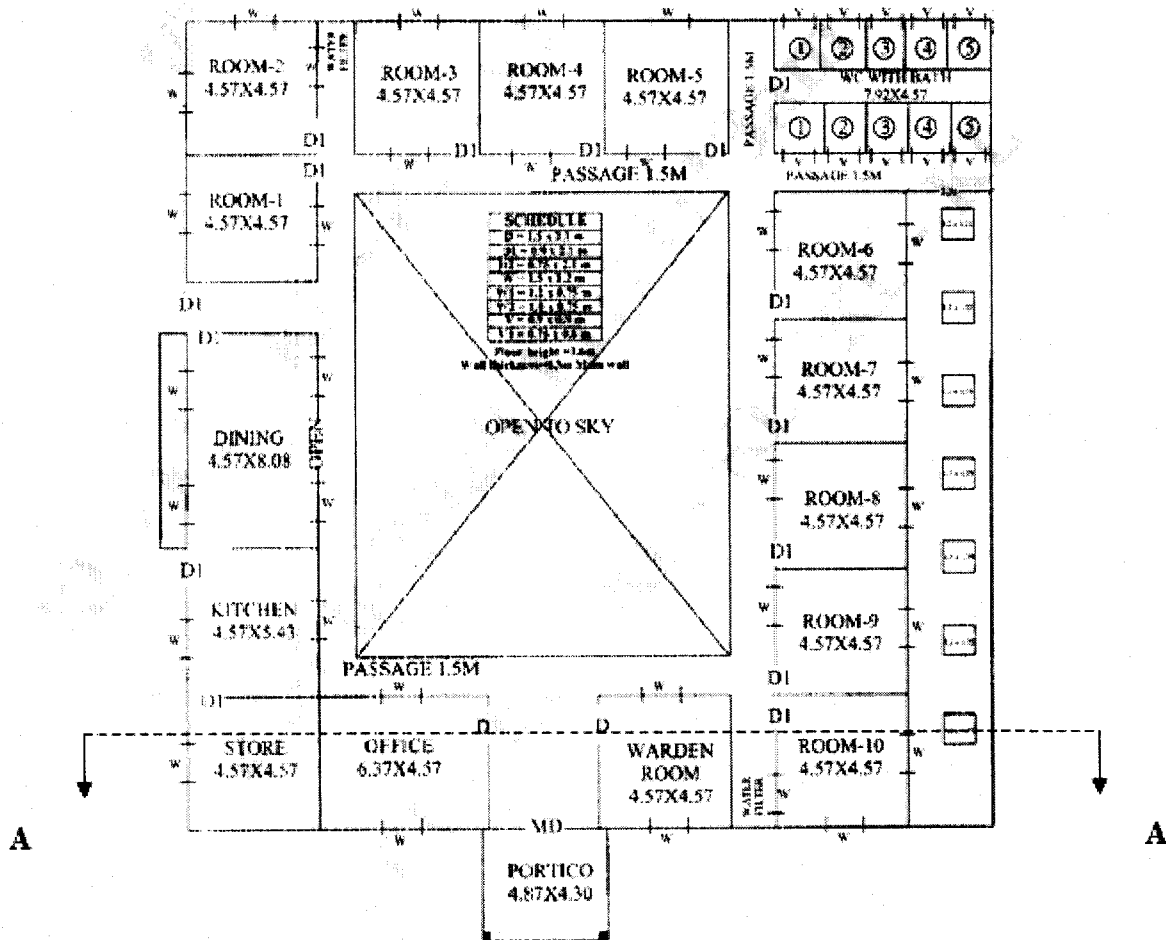


Fig Q4

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17CV552

Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Railways, Harbours, Tunneling and Airports

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Discuss the significance of the FOUR major modes of transportation. (06 Marks)
b. Describe the requirements of an ideal permanent way. (07 Marks)
c. An 8° branch curve diverges in an opposite direction from a 5° main curve in a BG yard. Determine the permissible speed on the branch line if the speed on the main line is restricted to 45 kmph. (07 Marks)

OR

- 2 a. Describe the indications of creep and effects of creep. (06 Marks)
b. Describe the requirements of sleepers. (07 Marks)
c. Describe the various types of gradients indicating the recommended values and conditions with examples. (07 Marks)

Module-2

- 3 a. Define plate laying, base and nail-head. Explain the operations in American method of plate laying. (06 Marks)
b. List the various classes of stations. Describe block stations and draw a neat sketch of a class B station with 3 lines. (07 Marks)
c. Describe a sump yard with a neat sketch. List the methods of stopping the rolling down wagons. (07 Marks)

OR

- 4 a. Estimate the quantities of materials required to construct 2 km length of BG railway track with a sleeper density of M+6. (06 Marks)
b. Discuss the factors to be considered for selecting the site for a railway station. (07 Marks)
c. Describe a marshalling yard with a neat sketch. (07 Marks)

Module-3

- 5 a. List the classification of harbours and draw a neat sketch of the layout of an artificial harbor with components. (10 Marks)
b. Discuss the advantages and disadvantages of tunnels. (10 Marks)

OR

- 6 a. List the types of breakwaters and discuss the characteristics of mound breakwaters. (10 Marks)
b. Explain the three systems of mechanical ventilation of Tunnels. (10 Marks)

Module-4

- 7 a. Discuss the advantages and limitations of air transport. (06 Marks)
b. Draw a neat sketch of an airport with open parallel concept of runways and explain the functions of the components. (10 Marks)
c. Describe the data to be collected for preparing a sand and scientific regional plan. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8= 50, will be treated as malpractice.

OR

- 8 a. Discuss the importance of vehicular circulation and parking area at airports and list the points to be considered for an efficient system. (06 Marks)
- b. List the factors to be considered while selecting a suitable site for a major airport and explain the features of a preferential runway with sketches. (10 Marks)
- c. Draw a neat sketch of an airport with offset parallel concept of runway showing the components. (04 Marks)

Module-5

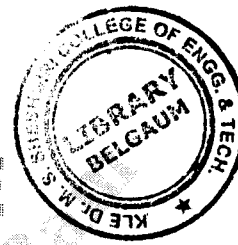
- 9 a. Explain (i) Cross wind component (ii) Wind coverage (iii) Calm period. (06 Marks)
- b. Determine the turning radius of the taxiway for operating a subsonic jet aircraft of wheel base 17.70m and tread of main gear 6.62m. Turning speed is 40 kmph. Airport is of type A. (06 Marks)
- c. Tabulate the summary of runway geometrics as per ICAO. (08 Marks)

OR

- 10 a. Explain the procedure of determining the best direction of orienting the runway as per Type-I wind rose diagram with assumed data. (06 Marks)
- b. List the assumed conditions under which basic runway length is determined. Explain the normal landing case. (06 Marks)
- c. The basic runway length required for a proposed airport is 1800 m. The airport site is at an elevation of 450 m above MSL. The monthly mean of average and maximum daily temperature for the hottest month of the year are 26°C and 38°C respectively. Determine the corrected length of runway required if the effective gradient is 0.22 percent. (08 Marks)

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15CV61

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Construction Management and Entrepreneurship

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of Graph(Plain) is permitted.

Module-1

- Define Management and list out management functions or process. (08 Marks)
 - Identify the stakeholder's in a construction project and explain the role of contractor. (08 Marks)

OR

- Explain the concept of work Breakdown structure with an example. (06 Marks)
 - Define "Activity" and "Event" as application to construction project. (02 Marks)
 - Using CPM method, determine "Critical activities" and "Critical path" for the Network given under Fig.Q2(c). What is project duration? (08 Marks)

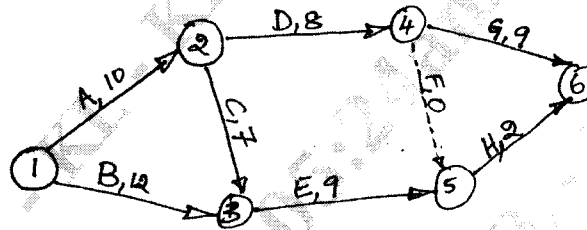


Fig.Q2(c)

Module-2

- Explain the main provisions of the Minimum Wages Act, 1948 (as amended recently). (06 Marks)
 - Define worker's productivity standard and list out typical factors affecting the workers production efficiency. (04 Marks)
 - A typical RCC building of G+2 floors have 900 MT of Reinforcement work for each floor. The work to be completed in 24 days with 8 hrs/day of working. A labour gang or team consisting of 1 HSKL + 2 skilled + 4 unskilled have productivity of 1.75 MT/hr worker team productivity will decrease by 7.5% for first floor work and further 7.5% @ second floor slab work. Estimate (i) Total number of worker gangs or teams required to complete the job. (ii) Number of man power, man days and man hours (iii) Unit rate for labour work if highly skilled gets Rs. 750/day, skilled gets Rs.600/day and unskilled Rs.500/day. (06 Marks)

OR

- List out factors behind the selection of construction equipments to perform an assigned task or project. (04 Marks)
 - List out various inventory control techniques for material management? What is A-B-C analysis? (04 Marks)

- c. An excavator with a bucket capacity of 1.22 cum and rated horse power of 180 HP is used for excavation of soil. Following information is available,
- Capital cost Rs.75 lakhs,
 - Technical life 5 years
 - Charged to the project : 2.5% per month of capital cost
 - Total hours employed per month = 300 Hrs
 - Prime mover = Diesel, Load factor = 0.85, Crank case capacity = 32 lit, Time between oil charge = 120 Hrs
 - Correction factor = 0.7, load factor = 0.85, Bucket swing factor = 1.00, Bucket fill factor = 0.90.
 - Operation and maintenance man power cost = Rs. 175/hr
 - Time cycle for one operation = 45 sec with 55 min per hour working.
 - Routine maintenance and major repair cost = 120% of depreciation or ownership cost.
 - Diesel rate Rs.70/lit ; Lube rate Rs. 200/kg.
- Estimate : (i) Hourly production rate is cum/hr
(ii) Cost of ownership and operation in Rs/hr
(iii) Unit rate of equipment operation in Rs/cum. (08 Marks)

Module-3

- 5 a. Explain : (i) Total Quality management (TQM)
(ii) Cost of Quality
(iii) Quality Control (QC) (12 Marks)
- b. What is the importance of "Tool Box Talks" and "Good House Keeping" in construction safety management? (04 Marks)

OR

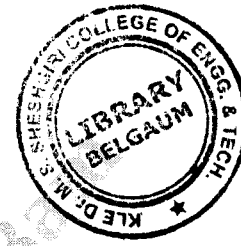
- 6 a. Define Values, Moral's and Ethics. List out seven ethical principles applicable to construction industry. (06 Marks)
- b. Describe the safety measures to be adopted while doing open excavation of earth and rock to avoid accidents. (06 Marks)
- c. List out Broad Principles of Quality Management System's as outlines under ISO 9000. (04 Marks)

Module-4

- 7 a. Discuss briefly "Concept of Engineering economic study and its principles". (06 Marks)
- b. What is the present equivalent money value of Rs.50,000/-, 5 Years from now. The rate of interest is 14% compounded quarterly. (04 Marks)
- c. A concrete mixer has following cash flow detail :
(i) Initial purchase price = Rs. 7,50,000/- (ii) Annual operating and maintenance cost of Rs.45,000/- (iii) Salvage value = Rs.2,10,000/- (iv) Useful life = 10 years. (v) 1 number of operator is employed and the cost of Rs. 30/- per hour. (vi) The mixer production rate is 0.1 cum per 1 hour. (vii) The revenue or cost generated by selling 1 cum of concrete is Rs.1000/- (viii) Interest rate on capital purchase = 11% per annum. Determine the quantity of concrete in m³ or cum in a year to be produced so that the Revenue generated will be Break even with the expenditure. (06 Marks)

OR

- 8 a. What is the total capitalized cost of a building which have (i) Construction cost Rs.1,00,000/- immediate (ii) Rs.10,000/- expenses each year for the first 4 years. (iii) Annual year end maintenance cost of Rs.5000/- plus the expenditure of Rs. 25000/- @ the end of each 10 years period for replacement purpose? (iv) Interest rate = 8% p.a. (04 Marks)



15CV61

- b. Cash flow for two projects A and B are given below with minimum attractive rate of return of 10%. Choose the best alternative using "Annual worth" method of analysis.

| End of year | 0 | 1 | 2 | 3 | 4 |
|-------------|-----------|----------|----------|----------|--------|
| Project A | -50,000/- | 5,000/- | 17,500/- | 30,000/- | 42,500 |
| Project B | -50,000/- | 40,000/- | 15,000/- | 15,000/- | 15,000 |

(08 Marks)

- c. A contractor has been awarded to do a job which requires procurement of an equipment. Two brands 'A' and 'B' are available to perform the job. Brand 'A' requires an investment of Rs. 4,50,000/- while brand 'B' requires an investment of Rs. 7,25,000/-. The annual savings generated by the Brands are :

| Brand | I year Rs. | II year Rs. | III year Rs. |
|-------|------------|-------------|--------------|
| A | 2,25,000/- | 2,25,000/- | 2,25,000/- |
| B | 3,00,000/- | 3,00,000/- | 3,00,000/- |

Which Brand of equipment should the controller choose? Assume rate of interest p.a = 8%.

(04 Marks)

Module-5

- 9 a. Define Entrepreneur? Explain the functions of an Entrepreneur. (08 Marks)
b. Define Micro, Small and Medium enterprises. List and explain the characteristics of 'MSME'. (08 Marks)

OR

- 10 a. What is "DPR"? Discuss the guidelines for the preparation of model project report for starting a new venture. (08 Marks)
b. What are the various ways of entry into International Business? (08 Marks)

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15CV62

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Design of Steel Structural Elements

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS-800-2007, SP(6)-1 or steel table is permitted.

Module-1

- 1 a. What are the advantages and disadvantages of steel structures? (08 Marks)
- b. Explain limit state of strength and limit state of serviceability. (08 Marks)

OR

- 2 a. State upper bound, lower bound and uniqueness theorems. (06 Marks)
- b. A propped cantilever ABCD is loaded as shown in Fig.Q.2(b). Find the collapse load if the beam is of uniform cross section. (10 Marks)

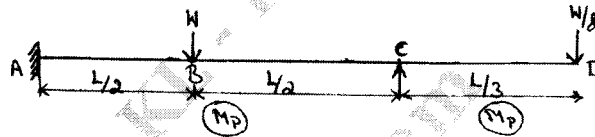


Fig.Q.2(b)

Module-2

- 3 a. Explain the phenomenon of load transfer in high strength friction grip bolts. (06 Marks)
- b. A double cover butt joint is used to connect two flats 200 ISF 10 with 8mm cover plates. The two plates are connected by 9 bolts in chain bolting at a pitch of 60mm and edge distance of 40mm. The bolts are arranged in 3 rows with 3 bolts in each row as shown in the Fig.Q.3(b). Determine the strength and efficiency of the joint. The diameter of the bolts used is 20mm. Assume grade of bolt as 4.6. (Assume both thread and shank to interfere the shear plane). (10 Marks)

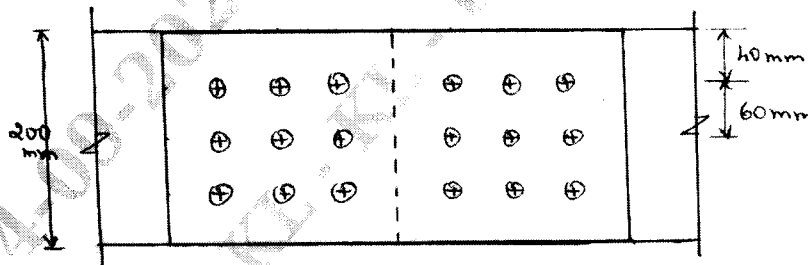


Fig.Q.3(b)

OR

- 4 a. Write the advantages of welded connections over bolted connections. (06 Marks)
- b. A tie member consisting of an ISA 80 × 50 × 8mm (Fe 410 grade steel) is welded to a 12mm thick gusset plate at site. Considering the size of weld as 6mm, find the length of weld required to transmit load equal to design strength of the member. (10 Marks)

Module-3

- 5 a. Determine the design strength of ISHB300@ 0.588kN/m, used as stanchion. Effective length of stanchion is 3.0m. (04 Marks)
- b. Design a compression member of a roof truss to carry an axial load of 150kN. Design the member using a single unequal angle and the corresponding connections to a gusset plate using 20mm diameter bolts of grade 4.6 grade, connecting the longer legs to the gusset plate of 8mm thick. Take effective length of the member as 2.5m. (12 Marks)

OR

- 6 The axial load on a steel column is 2000kN. The column of length 5m is effectively held in position at both ends and restrained in direction at the end. Design a suitable built-up column made of 2 I-sections spaced apart, adopting a single lacing system. Consider permissible stress (f_{cd}) = 180N/mm². (16 Marks)

Module-4

- 7 a. Explain: i) Lug angles ii) Shear Lag. (06 Marks)
- b. Determine the design tensile strength of the plate 200 × 10mm with bolts as shown in Fig.Q.7(b). The yield and ultimate strengths of steel are 250MPa and 410MPa respectively. The diameter of bolt used is 20mm. (10 Marks)

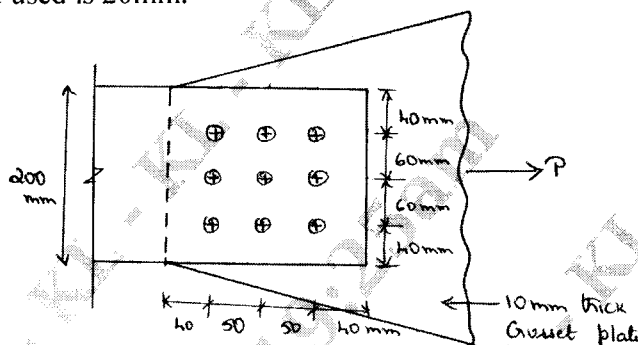


Fig.Q.7(b)

OR

- 8 a. With the help of neat sketches, explain the different types of column bases. (06 Marks)
- b. Design a suitable slab base for a column carrying an axial load of 800kN. The section of the column is built up by ISHB250 @ 54.7 kg/m and 2 plates 300mm × 10mm one on each flange of the joint section. The bearing capacity of the soil is 250 kN/m². Consider grade of concrete as M20, thickness of weld as 8mm and bearing strength of concrete as 9N/mm². (10 Marks)

Module-5

- 9 a. Explain the factors affecting the lateral stability of beams. (08 Marks)
- b. Calculate the moment and shear capacity of a laterally restrained beam ISLB350 @ 0.486kN/m. (08 Marks)

OR

- 10 a. Write a note on the ways to connect a beam and a column. (04 Marks)
- b. Check the adequacy of a laterally restrained cantilever beam ISMB 550@ 1.037 kN/m to withstand a moment of 562.5 kN-m and shear force of 225kN, performing all checks necessary for design of a beam. (12 Marks)

2 of 2

- b. Explain the term "Zone of Purification" in a river. (05 Marks)
 c. Derive the Streeter-Phelps Oxygen Sag equation in river analysis. (06 Marks)

Module-3

- 5 a. Explain the various waste water characteristics. (05 Marks)
 b. Distinguish between Grab sampling and Composite sampling. (05 Marks)
 c. Draw a neat flow diagram of a domestic sewage treatment plant showing various unit operations and unit processes and briefly explain. (06 Marks)

OR

- 6 a. Explain with a neat sketch working of a Trickling filter. (05 Marks)
 b. Distinguish between suspended growth and fixed film biological processes. (05 Marks)
 c. Design a set of two rectangular primary settling tanks for type-I settling of sewage for an average flow of 20000 m³/d, design SOR of 40m³/m².d. Draw a neat sketch of the same. Assume peak flow = 2.5 times average flow check whether the design ensures safety against re-suspension if max. scour velocity = 0.06 m/s. (06 Marks)

Module-4

- 7 a. Discuss the effect of effluent discharge on streams. (05 Marks)
 b. Explain the terms volume reduction and strength reduction of industrial waste water. (05 Marks)
 c. How is shock loading on treatment plants prevented using equalization and proportioning. (06 Marks)

OR

- 8 a. Explain the advantages and disadvantages of combined treatment of industrial waste with domestic waste water. (05 Marks)
 b. Discuss the methods of removal of "inorganic solids" from industrial waste water. (05 Marks)
 c. Explain the methods of maintaining quality in a stream using effluent and stream standards. (06 Marks)

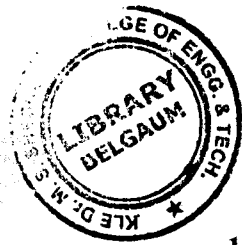
Module-5

- 9 a. Explain the effect of dairy waste on receiving streams and give a treatment proposal. (05 Marks)
 b. Explain the treatment of cane sugar effluent with the help of a flow chart. (05 Marks)
 c. Explain the role of anaerobic stabilization ponds as energy efficient method of treating distillery waste. (06 Marks)

OR

- 10 a. Give the schematic flow diagrams of cotton textile industry showing the generation of wastewater. (05 Marks)
 b. Give the typical characteristics of Indian tannery industrial waste water. (05 Marks)
 c. Tuna fish canning industry is proposed near the coast. What are the expected operations leading to discharge of waste? Also give the treatment strategy. (06 Marks)

CBCS SCHEME



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15CV72

Seventh Semester B.E. Degree Examination, Aug./Sept.2020

Design of RCC and Steel Structures

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any TWO full questions, choosing ONE full question from each module.
2. Use of IS-456, IS-800, SP(16), SP(6) and steel tables are permitted.

Module-1

- 1 Design a slab type rectangular combined footing for two columns, A = 350 mm × 350 mm and B = 400 mm and 400 mm in size to carry axial service load of 600 kN and 900 kN respectively. The columns are spaced at 3.6 m centre to centre. SBC of soil is 175 kN/m². The property line is 0.74m from centre of column A. Use M20 grade concrete and Fe-415 grade steel. (40 Marks)

OR

- 2 Design a single bay portal frame, fixed at the base for the following data:
Effective span of portal frame = 10 m
Spacing of portal frame = 4 m
Height of column above footing = 5.5 m (effective)
Thickness of slab to be adopted = 150 mm
Live load on slab = 1.6 kN/m²
Floor finish = 0.75 kN/m²
SBC of soil = 200 kN/m²
Use M20 grade concrete and Fe 415 steel. Design the slab, beam, column and footing. (40 Marks)

Module-2

- 3 The centre line of a roof truss is as shown in Fig.Q3. The magnitude and nature of forces under service conditions are :
Top Chord members = 120 kN Compression
Bottom Chord members = 100 kN Tension
Interior members = 60 kN Tension and 50 kN Compression
For all the interior members use similar single angle sections. Design all the members and joints using M₁₆ turned bolts of grade 4.6. Also design bearing plate, base plate and anchor bolts to connect the truss to an RCC column 300 mm × 300 mm of M₂₀ grade concrete.

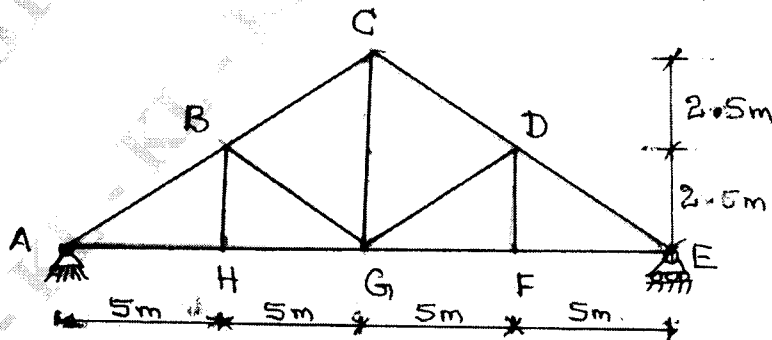


Fig.Q3

(40 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.



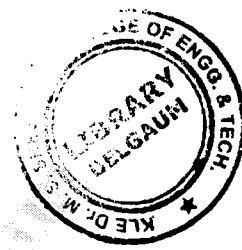
OR

- 4 Design a welded plate girder, effective span of 18 meters is simply supported at its ends. It carries a uniformly distributed load of 60 kN/m in addition to two point loads each of magnitude 400 kN placed at one third span points. Design:
- (i) Cross section of plate girder at midspan.
 - (ii) End and intermediate stiffeners
 - (iii) Welded connection between flange and web
 - (iv) Welded connection between web and stiffeners

(40 Marks)

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CBCS SCHEME



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15CV73

Seventh Semester B.E. Degree Examination, Aug./Sept.2020 Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks: 80

- Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data may suitably be assumed.

Module-1

- 1 a. Explain various practical application of hydrology. (08 Marks)
b. With neat sketch, explain an engineering representations of a hydrological cycle (Horton's). (08 Marks)

OR

- 2 a. Explain various methods of obtaining mean precipitations with equations. (08 Marks)
b. The normal annual rainfall of stations A, B, C and D in a catchment are 809.7, 675.9, 762.8, 920.1 mm respectively. In the year 2016, the station D was inoperative when station A, B, C recorded annual rainfall of 911.1, 722.3, 798.9 mm respectively. Estimate the missing rainfall at D in the year 2016 by normal ratio method. (08 Marks)

Module-2

- 3 a. Discuss the various factors affecting evaporation. (08 Marks)
b. The following meteorological data pertain to a large reservoir with water spread area of 15 km². The data represents the average values for the day.
Water temperature = 24°C
Air temperature = 26°C
Atmospheric pressure = 752 mm of mercury
Wind speed at 0.5 m above G.L = 25.3 km/h
Relative humidity = 46%
Estimate average daily evaporation from the reservoir and evaporation loss from the reservoir for a period of one week using Meyer's and Rohwer's equations. (08 Marks)

OR

- 4 a. During November at a particular place, the percentage of sunshine hours is 7.2 and mean temperature is 18°C. If the consumptive use coefficient of crop is 0.7 for that month, find the consumptive use or evapotranspiration of the crop in mm/day by Blaney-Criddle method. (08 Marks)
b. A 6h storm produced rainfall intensity of 7, 18, 25, 12, 10 and 3 mm/h in successive one hour interval over a basin of 800 sq.km. the resulting runoff is observed to be 2640 hectare-metres. Determine the ϕ index for the basin. (08 Marks)

Module-3

- 5 a. What is runoff? Explain with sketch different types of catchment. (08 Marks)
b. Explain the rainfall-runoff relationship using regression analysis (any one method). (08 Marks)

1 of 2

OR

- 6 a. Explain with a sketch 5-curve and its components. (06 Marks)
 b. Define unit hydrograph. What are the assumptions, limitations and uses of unit hydrograph theory? (10 Marks)

Module-4

- 7 a. Discuss briefly the benefits and ill effects of irrigation. (08 Marks)
 b. Explain with a sketch Bandhara irrigation. (08 Marks)

OR

- 8 a. Explain with equations of various types of irrigation efficiencies. (08 Marks)
 b. The gross commanded area for an irrigation canal is 20,000 hectares out of which 75% is culturable CA. Intensity of irrigation is 40% for rabi and 10% for rice. If Kor period is 4 weeks for rabi and 2.5 weeks for rice, determine outlet discharge. Outlet factors for rabi and rice may be taken as 1800 ha/cumec and 775 ha/cumec respectively. Also calculate delta for each case. (08 Marks)

Module-5

- 9 a. Define the following:
 (i) GCA (ii) CCA (iii) Intensity of irrigation
 (iv) Time factor (iv) Capacity factor (v) Crop rotation (06 Marks)
 b. Design an irrigation channel in alluvial soil according to Lacey's silt theory for the following data:
 Full supply discharge = 10 cumecs
 Lacey's silt factor = 0.9
 Side slope of channel = $\frac{1}{2}$ (H) : 1 (V)
 Also determine the bed slope of the channel. (10 Marks)

OR

- 10 a. Explain:
 (i) Safe yield
 (ii) Average yield
 (iii) Mass curve with sketch
 (iv) Demand curve with sketch (06 Marks)
 b. Explain:
 (i) Investigation for reservoir site
 (ii) Economic height of dam (10 Marks)

CBCS SCHEME



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15CV741

Seventh Semester B.E. Degree Examination, Aug./Sept.2020

Design of Bridges

Time: 3 hrs.

Max Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. Use of IRC 6, IRC21, IS-456-2000 is permitted.

3. Sketch reinforcement details wherever necessary.

Module-1

- a. Briefly discuss any three methods for computation of Peak Flood discharge. (06 Marks)
b. Write short notes on the following with respect to hydraulic design of Bridges.
Linear waterway, Economical span, Scour depth and Afflux. (10 Marks)

OR

- a. Explain fixation of linear waterway in (i) streams with rigid boundaries (ii) Quasi – Alluvial soil (iii) Alluvial soil streams. (06 Marks)
b. The following levels are available from a bridge site. HFL of flow is 97.960 mtr. Calculate hydraulic mean radius using Area Velocity method.

| Chainage (m) | Bed Level (m) |
|--------------|---------------|
| 60 | 97.960 |
| 55 | 95.700 |
| 50 | 94.600 |
| 40 | 91.800 |
| 20 | 91.400 |
| 0 | 90.900 |
| 20 | 91.100 |
| 40 | 95.160 |
| 50 | 95.800 |
| 55 | 96.800 |
| 62 | 97.960 |

(10 Marks)

Module-2

- A slab culvert is proposed across a stream in an Highway having following data:
Design the deck slab adopting M25 grade concrete and Fe 415 steel. [Shear Analysis and Footpath design not required]
Carriageway width = 7.50 m. ; Footpath width = 1.00m
Effective span of bridge deck = 6.40 mtr ; Wearing coat thickness = 80 mm
Loading = IRC Class A Two Lane loading. (16 Marks)

OR

- Design the Deck slab for a culvert using below given data:
Road width = 7.50 m ; Width of kerb = 0.60 m
Effective span of deck slab = 4.40 m
Thickness of wearing coat = 80 mm
Grade of concrete = M25
Grade of steel = Fe 415
Loading = IRC Class AA Tracked. (16 Marks)

(16 Marks)

1 of 2

Module-3

- 5 In a State highway a T Beam Girder Bridge is to be constructed across a river. The details are as below:
 Carriageway width = 7.50 mt ;
 Kerb width = 0.60
 Kerb thickness above slab level = 0.30 mtr
 Wearing coat thickness = 0.08 mtr
 Effective span of Bridge = 16 mtr
 Live Load = IRC Class AA Tracked.
 Adopting M25 grade concrete and Fe 415 steel, design outer girder of bridge [Shear Analysis not required]. (16 Marks)

OR

- 6 a. Three Longitudinal girders at a spacing of 2.50 m are provided in a Slab Girder Bridge,
 b. Spanning over a Nala with c/c distance of Bearings equal to 16 mtr. Spacing of cross girders is 4.00 mtr c/c. Width of carriageway is 7.50 mtr. Footpath width is 1.00 mtr. Average thickness of wearing coat is 60 mm. Design interior panel of slab adopting M25 concrete and Fe 415 steel. IRC Loading : Class AA Tracked. (16 Marks)

Module-4

- 7 a. Draw neat sketches of Beddings for concrete pipes in pipe culverts. (03 Marks)
 b. A Single Cell Box culvert with inner dimensions of 3.50m × 3.50m is provided in a highway of 7.50 mtr wide. Thickness of earth fill over top slab is 65 cms. Live load on culvert is 45 kN/m². Angle of internal friction of soil (ϕ) is 30° and unit weight is 18.47 kN/m³. Analyze the Box frame considering Dead load, Live load and Earth pressure for NO flow condition in nala. Calculate final moments and draw BM diagrams. (13 Marks)

OR

- 8 a. Explain steps involved in structural design of pipes in a pipe culvert. (03 Marks)
 b. A single cell box culvert is to be designed for an culvert in a highway with following data:
 Box inside dimensions : 3m × 3m ; Earth fill load above top slab : 14 kN/m²
 Width of carriageway = 7.50 mtr ; IRC Live load – Class AA Tracked
 Unit weight of soil is 18 kN/m³ and angle of internal friction is 30°. Find final moments in top and bottom slab, vertical walls considering Dead Load, Live load and earth pressure combination. (13 Marks)

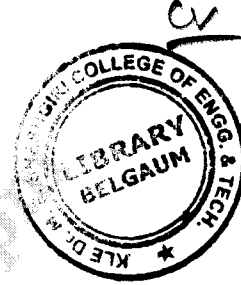
Module-5

- 9 a. List factors to be considered while selecting Bridge Bearings. (05 Marks)
 b. Draw typical shapes of piers commonly used in concrete bridges. List loads and forces to be considered in pier design. (11 Marks)

OR

- 10 a. Discuss main functions of a Bridge Bearing. List four major forces considered in the design of Bearings. (05 Marks)
 b. Explain any six forces considered in the design of Abutments. With necessary sketch explain stability analysis of Abutment. (11 Marks)

CBCS SCHEME



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15CV81

Eighth Semester B.E. Degree Examination, Aug./Sept.2020 Quantity Surveying and Contracts Management

Time: 3 hrs.

Max. Marks: 80

- Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 Prepare a detailed estimate for a residential building shown in Fig.Q1, for the following items of work:

- Earthwork excavation for foundation in hard soil
- BBM walls with CM 1:6 for super structures
- Cement plaster (1:3), inside and outside walls.

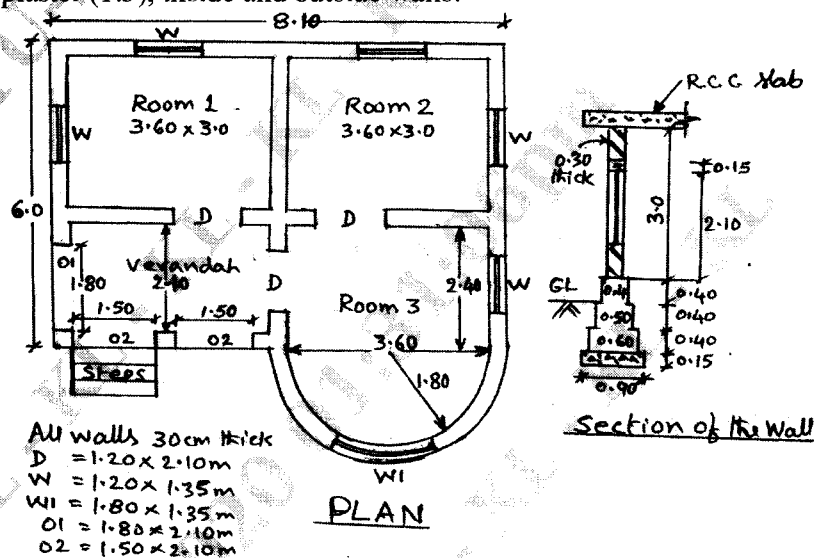


Fig.Q1

(16 Marks)

- 2 Estimate the cost of RCC roof slab in C.C 1:1½ :3 over a room of internal dimension 3.2m x 4.2m. Calculate the quantity of concrete and steel reinforcement. Given : Slab thickness = 150mm, Two-way slab. Steel requirement : Main steel = 10mmφ @ 150 mm c/c Secondary steel : 8mmφ @200mm c/c. Alternate bars cranked at one end only. TMT bars used, hence provide L-bind at ends. Wall thickness = 200 mm, Cost of concrete = Rs. 12,000/m³. Cost of steel bars = Rs. 50/kg.

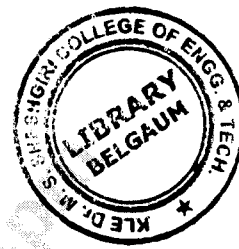
(16 Marks)

Module-2

- 3 The details of manhole is given in Fig.Q3. Find its quantities of the following items:
- Earth work excavation for foundation in hard soil.
 - B.B.M in CM 1:4 for walls
 - RCC roof voicing slab in C.C. 1:2:4
 - Plastering in CM 1:3 for inside walls.
 - Bed concrete in CC 1:3:6

(16 Marks)

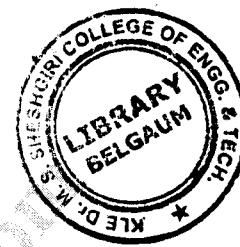




15CV81

Module-5

- 9 a. What is measurement book? What are the rules to be followed in recording measurement book? (08 Marks)
- b. A building is situated by the side of a main road. The built up portion is $20\text{m} \times 15\text{m}$. The building is of first class type and provided with water supply, sanitation and electric fitting. Age of the building is 30 years. Workout the valuation of the property. Area of land on which building stands is 500m^2 . Assume plinth area rate as Rs $20,000/\text{m}^2$, life of the building 100 years and cost of land, Rs. $2500/\text{m}^2$. (08 Marks)
- 10 a. Define (i) Obsolescence (ii) Sinking fund (iii) Depreciation (iv) Mortgage (v) Scrap value (vi) Leasehold property. (06 Marks)
- b. A person has purchased a plot of land costing Rs. 8,00,000/- and has constructed a building there on at a total cost of Rs. 20 lakh including water supply, sanitary and electrical installation etc. Allowing a net return @ 7% on the cost of construction and @ 5% net return on the cost of land, workout the standard rent of the property with the following data:
- (i) Sinking fund on 4% basis for the future life of 75 years = 0.0022
- (ii) Annual maintenance 0.5% of the cost of construction
- (iii) Municipal taxes and other outgoings @ 28% of the gross rent. (10 Marks)



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15CV82

Eighth Semester B.E. Degree Examination, Aug./Sept.2020 Design of Prestressed Concrete Structural Elements

Time: 3 hrs.

Max. Marks: 80

- Note:** i) *For Regular Students:* Answer any **FIVE** full questions irrespective of modules.
 ii) *For Arrear Students :* Answer any **FIVE** full questions, choosing **ONE** full question from each module.

Module-1

- 1
 - a. Distinguish between pretensioning and post tensioning. (05 Marks)
 - b. Explain why high strength steel and high strength concrete are used in prestressed concrete. (06 Marks)
 - c. Explain with a neat sketch "Hoyer's long line" system of pre-tensioning. (05 Marks)

- 2

A pretensioned concrete beam having an unsymmetrical I-section having overall depth 1300mm, top flange 600mm wide and 250mm thick, bottom flange 350mm wide and 300mm thick and thickness of web is 150mm is used to support live load of 11kN/m over a span of 30m. The prestressing force of 3200kN is located at an eccentricity of 580mm at the centre of span section. Determine the extreme fibre stresses at mid span section when the beam supports dead and live loads assuming the loss of prestress is 15 percent. (16 Marks)

Module-2

- 3
 - a. How do you estimate the loss of prestress due to
 - i) Elastic deformation
 - ii) Shrinkage of concrete
 - iii) Creep of concrete. (06 Marks)
 - b. A pretensioned beam 250mm wide and 360mm deep is prestressed by 10 wires of 8mm diameter initially stressed to 1000N/mm^2 . The centroid of the steel wires is located at 105mm from the soffit. Determine the maximum stress in concrete immediately after transfer allowing elastic shortening of concrete only at the level of the centroid of steel. If however the concrete is subjected to additional shortening due to creep and shrinkage and the steel is subjected to a relaxation of stress of 5 percent. Find the final percentage of loss of prestress in the steel wires.
 Take $E_s = 210\text{kN/mm}^2$, $E_c = 36.85\text{kN/mm}^2$, Creep coefficient = 1.60. Total residual shrinkage strain = 3×10^{-4} . (10 Marks)

- 4
 - a. What are the factors affecting deflection of a PSC beam? (06 Marks)
 - b. A prestressed concrete beam of rectangular section 120mm wide and 300mm deep, span over 6m. The beam is prestressed by a straight cable carrying an effective force of 200kN at an eccentricity of 50mm. The modulus of elasticity of concrete is 38kN/mm^2 . Compute the deflection at centre of span for the following cases:
 - i) Deflection under prestress + self weight
 - ii) Find the magnitude of uniformly distributed live load which will nullify the deflection due to prestress and self weight. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. What are the different flexural failure modes observed in prestressed concrete beam? Explain with sketches. (06 Marks)
- b. A post tensioned bridge girder with unbounded tendons is of box section of overall dimensions 1200mm wide \times 1800mm deep with wall thickness 150mm. The high tensile steel has an area of 4000mm² and is located at an effective depth of 1600mm. The effective prestress in steel after all losses is 1000N/mm² and the effective span of the girder is 24m. If $f_{ck} = 40\text{N/mm}^2$ and $f_p = 1600\text{N/mm}^2$, estimate the ultimate flexural strength of the section. (10 Marks)
- 6 Design a post tensioned prestressed concrete roof girder to suit the following data:
 Effective span = 20m
 Live load = 12kN/m
 $f_{ck} = 50\text{N/mm}^2$
 $f_{ct} = 41\text{N/mm}^2$
 lose ratio = 0.85
 Cable containing 12 wires of 7mm diameter ($f_p = 1500\text{N/mm}^2$) are available for use. Design the girder as Type-1 member to confirm IS1343. (16 Marks)

Module-4

- 7 a. Explain different methods of improving shear resistance of PSC members. (06 Marks)
- b. A prestressed girder of rectangular section 150mm wide shear force of 130kN. The uniform prestress across the section is 5N/mm². Given the characteristic strength (cube) strength of concrete is 40N/mm² and Fe-415 HYSD bars of 8mm diameter, design suitable spacing for the stirrups confirming to Indian standard code IS-1343 recommendations. Assume cover to the reinforcement as 50mm. (10 Marks)
- 8 a. Explain mechanism of shear failure in PSC beams. (06 Marks)
- b. The horizontal prestress at the centroid of a concrete beam of rectangular section 120mm \times 250mm is 7N/mm² and the maximum shearing force on the beam is 70kN. Calculate the maximum principal tensile stress, what is the maximum vertical stress required to eliminate this principal stress? (10 Marks)

Module-5

- 9 a. Write a note on zone stresses. (06 Marks)
- b. The end block of a prestressed concrete girder is 200mm wide \times 300mm deep. The beam is post tensioned by two Freyssinet anchorage each of 100mm diameter with their centres located at 75mm from top and bottom of beam. The force transmitted by each anchorage being 2000kN. Compute the bursting force and design suitable reinforcements according to IS1343, sketch the arrangement of anchorage zone reinforcement. (10 Marks)
- 10 The mid section of a composite T beam comprises a pretensioned beam 300mm wide and 900mm deep and an in-situ cast slab 900mm wide and 150mm deep. The effective prestressing located 200mm from the soffit of the beam is 2180kN. The moment due to the weight of the precast section is 273kN-m at mid span. After this is erected in place, the top slab is cast producing a moment of 136.5kN-m at midspan. After the slab concrete is hardened, the composite section is to carry a maximum live load moment of 750kN-m. Compute the resultant final stresses at
 i) The top of slab
 ii) The top and bottom of precast section. (16 Marks)



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15CV831

Eighth Semester B.E. Degree Examination, Aug./Sept.2020 Earthquake Resistant Design of Structures

Time: 3 hrs.

Max. Marks: 80

- Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.
iii) Use of IS 1893:2002 is permitted.*

Module-1

- Distinguish between Magnitude and Intensity of earthquake. (08 Marks)
 - Explain importance of considering the local site effect in evaluating the earthquake force. (04 Marks)
 - Discuss theory of plate tectonics with regards to causes of earthquake. (04 Marks)
- Explain seismic zoning map of India with respect to background and use of seismic zoning in computation of seismic forces. (08 Marks)
 - Explain in detail with neat sketches different types of seismic waves and their propagation. (08 Marks)

Module-2

- What are the methods to control or modify the structural response to seismic activity? Elaborate any one of them. (08 Marks)
 - Explain strong motion characteristics of an earthquake. (08 Marks)
- Explain the tripartite plot of design spectrum and significance of spectral regions. (08 Marks)
 - Differentiate between response history and response spectrum and explain the factors influencing the response acceleration $\left[\frac{S_a}{g} \right]$ with neat diagrams. (08 Marks)

Module-3

- Explain vertical irregularity in general and soft storey in particular with reference to earthquake resistance. Explain special provisions of design of buildings with soft storey. (10 Marks)
 - A building having a non-uniform distribution of mass is shown in the Fig.Q5(b). Locate its centre of mass.

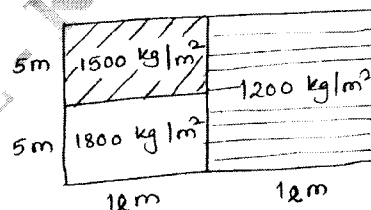


Fig.Q5(b)

(06 Marks)

- Explain different lateral load resisting system with sketches. (10 Marks)

- b. For moment resisting frames idealized as shear buildings. Investigate the building structure shown in Fig.Q6(b) has soft storey or extreme soft storey. M.I of each column is indicated.

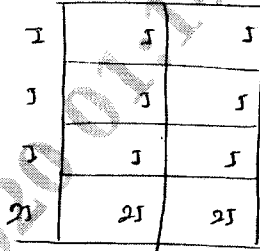


Fig.Q6(b)

(06 Marks)

Module-4

- 7 A four storey building of plan shown in Fig.Q7 is located in seismic zone IV. Number of stories – 4 (G + 3) is RCC (SMRF) for office (Importance Factor = 1). The loads on the floors are W_1 (Roof) = 3000 kN; $W_2 = W_3 = W_4 = 4200$ kN (L.L. = 3.5 kN/m²)
The storey heights are : Ground floor = 4.2 m ; first storey = 3.2 m ; second storey = 3.2 m, third storey = 3.2 m.

The building is founded on rocky site. Compute the seismic forces for each storey by equivalent static lateral force method. [Assume infill walls].

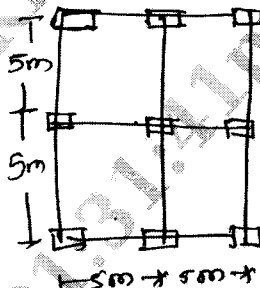


Fig.Q7

(16 Marks)

- 8 For the residential RCC (SMRF) building founded on soft soil and situated in zone V as shown in Fig.Q8, compute the seismic forces for each storey using dynamic analysis procedure given : Free vibration analysis results.

Frequencies : $\omega = \{47.832 \quad 120.155 \quad 167.0\}$

Modes $\{\phi_1\} = \{1.00 \quad 0.759 \quad 0.336\}$

$\{\phi_2\} = \{1.00 \quad -0.805 \quad -1.157\}$

$\{\phi_3\} = \{1.00 \quad -2.427 \quad 0.075\}$

and $k_1 = k_2 = 160 \times 10^3$ kN/m ; $k_3 = 240 \times 10^3$ kN/m

$w_1 = w_2 = w_3 = 196.2$ kN

Use SRSS modal combination rule.

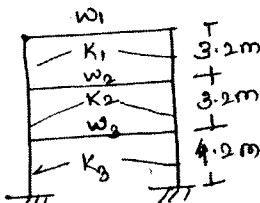
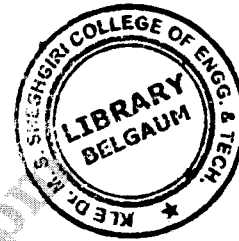


Fig.Q8

(16 Marks)



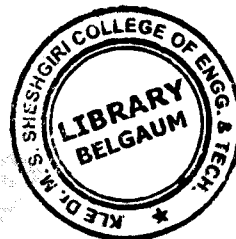
15CV831

Module-5

- 9 a. What are the provisions for increasing the seismic resistance of masonry buildings? Discuss in detail, with sketches, wherever necessary. (10 Marks)
- b. Write notes on Failure patterns in Masonry buildings. (06 Marks)
- 10 a. Write a note on / explain Detailing of beam – column joints to enhance ductility as per IS 13920. (06 Marks)
- b. Write a note on Retrofitting of Masonry buildings and RC buildings. (10 Marks)

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CBCS SCHEME

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15CV832

Eighth Semester B.E. Degree Examination, Aug./Sept.2020 Hydraulic Structures

Time: 3 hrs.

Max. Marks: 80

- Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.
iii) Missing data may be suitably assumed.*

Module-1

- 1 a. Explain with a neat sketch, different forces acting on a gravity dam. (08 Marks)
b. Show that $B = \frac{H}{\sqrt{S_c - C}}$ with usual notations considering the elementary profile of a gravity dam. (08 Marks)
- 2 a. What are the modes of failure of gravity dam? Explain. (08 Marks)
b. Explain with neat sketches, the functions of drainage gallery. (08 Marks)

Module-2

- 3 a. Explain different causes of failures of earthdams. (08 Marks)
b. How Seepage discharge is computed in (i) Isotropic soils (ii) Anisotropic soils. (08 Marks)
- 4 a. An earthdam made of a homogenous material has the following data:
Coefficient of permeability of dam material = 5×10^{-4} cm/sec
Level of top of dam = 200.0 m
Level of deepest river bed = 178.0 m
HFL of reservoir = 197.5 m
Width of top of dam = 4.5 m
Upstream slope = 3:1
Downstream slope = 2:1
Draw the seepage line and determine quantity of seepage passing through the dam if a horizontal filter of length equal to 25 m is provided inward from the downstream toe of the dam. (08 Marks)
b. Explain with neat sketches types of Earthdams. (08 Marks)

Module-3

- 5 a. How do you design the apron using Khosla's theory? Explain with sketches. (08 Marks)
b. What is spillway? Mention different types of spillway. Explain Ogee spillway. (08 Marks)
- 6 a. How do you design the apron using Bligh's theory? Explain. (08 Marks)
b. How Energy dissipation is carried out below spillways? (08 Marks)

Module-4

- 7 a. What are different types of cross drainage works? Explain with neat sketches. (08 Marks)
b. How do you select a suitable type of cross drainage work? (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

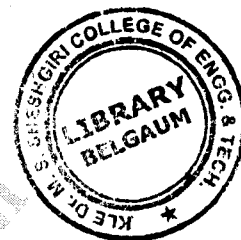


- 8 Design:
- Drainage waterway
 - Canal waterway
 - Transitions
 - Trough for the following data at the crossing of a canal and a drainage :
 - Canal: Full supply discharge = 32 cumecs
 - Full supply level = RL 213.5
 - Canal bed level = RL 212.0 m
 - Canal bed width = 20
 - Trapezoidal canal section with $1\frac{1}{2}$ H : 1 V slopes
 - Drainage: High flood discharge = 300 cumecs
 - High flood level = 210 m
 - High flood depth = 2.5 m
 - General ground level = 212.5 m
- (16 Marks)

Module-5

- What are canal outlets? Explain any two canal outlets with figure. (08 Marks)
 - What is the necessity of canal falls? Explain any two types of canal falls with neat sketches. (08 Marks)
- 10 a. What are the functions of head regulator and cross regulators? Explain with sketches. (08 Marks)
- b. Explain with sketches:
- Trapezoidal notch fall
 - Alignment of the off-taking channel (08 Marks)

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CBGS SCHEME

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15CV833

Eighth Semester B.E. Degree Examination, Aug./Sept.2020

Pavement Design

Time: 3 hrs.

Max. Marks: 80

Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.

ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly explain the Pavement Components and functions of components. (04 Marks)
- b. Write comparison between Flexible and Rigid Pavement. (04 Marks)
- c. Explain briefly Design factors to be considered in the design of pavement. (08 Marks)
- 2 a. List and briefly explain the assumptions and limitations of Bousinerq's theory. (08 Marks)
- b. Design the thickness of a flexible pavement by Bunmister's two layer analysis for a wheel load of 40 kN and a tyre pressure of 0.5 MN/m². The modulus of elasticity of the pavement materials is 150 MN/m² and that of the subgrade is 30 MN/m². (08 Marks)

Module-2

- 3 a. With a sketch describe the significance of design wheel load and contact pressure in design of pavement. (04 Marks)
- b. Explain the concept of Equivalent Single Wheel Load (ESWL). (04 Marks)
- c. Calculate the design repetition for 20 years period for wheel load equivalent to 2268 kg wheel load using the following traffic survey data on a four lane road.

| Wheel load (kg) | Average daily traffic ADT in both directions | % of total traffic volume |
|-----------------|----------------------------------------------|---------------------------|
| 2268 | | 13.17 |
| 2722 | Total volume | 15.30 |
| 3175 | 215 | 11.76 |
| 3629 | Considering traffic growth | 14.11 |
| 4082 | | 6.21 |
| 4532 | | 5.84 |

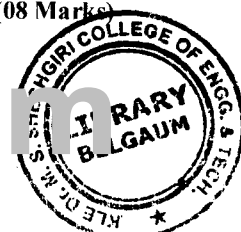
(08 Marks)

- 4 a. Design a highway pavement using McLeod method of wheel load 6000 kg with tyre pressure of 6 kg/cm². The plate load test conducted on subgrade soil using 30 cm dia plate yield a pressure 2.8 kg/cm² after 10 load repetitions at 0.5 cm deflection. (08 Marks)
- b. In a dual wheel assembly the load on each wheel is 32 kN tyre pressure is 0.6 N/mm² and c/c wheel spacing 410 mm. The load is placed on a pavement 500 mm thick. The subgrade characterized by E = 20 N/mm² and $\mu = 0.5$. Calculate the deflection on the top of subgrade at the radial distance of 0.15 and 250 from the centre of left wheel measured towards other wheel using deflection chart. (08 Marks)

Module-3

- 5 a. Explain typical failures of flexible pavement. (08 Marks)
- b. Briefly explain the various maintenance works of bituminous surfaces. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



- 6 Write notes on:
- a. Roughness measurement (04 Marks)
 - b. Falling Weight Deflectometer (04 Marks)
 - c. Benkelman beam deflection method (08 Marks)

Module-4

- 7 a. Explain:
- (i) Radius of relative stiffness
 - (ii) Equivalent radius of resisting section
 - (iii) Critical load position (08 Marks)
- b. A cement concrete pavement of 25 cm thickness is constructed over a granular surface having modulus of reaction 10 kg/cm^3 . The maximum temperature different between the top and bottom of the slab during winter is found to be 15°C . The spacing between the transverse joint is 7.5 m. Find the worst combination of stresses at the edge and corner regions. (08 Marks)
- 8 a. Write the step by step procedure for the design of concrete pavement as recommended by IRC 52.2002. (08 Marks)
- b. Design the size and spacing of dowel bar at the expansion joints of a cement concrete pavement of thickness 25 cm with radius of relative stiffness 80 cm. For a design wheel load of 5000 kg. Assume load capacity of the dowel system as 40% of the design wheel load joint width is 2 cm, permissible shear and flexural stress in the dowel bar are 1000 and 1400 kg/cm^2 and permissible bearing stresses in cement concrete is 100 kg/cm^2 diameter of dowel bar = 2.5 cm. (08 Marks)

Module-5

- 9 a. Explain the failures in Rigid Pavement. (08 Marks)
- b. Explain different methods of pavement evaluation. (08 Marks)
- 10 a. List the types of joints and explain briefly. (08 Marks)
- b. List and explain the desirable properties of subgrade. (08 Marks)

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