

Register Number :

Name of the Candidate :

3 0 2 0

B.E. DEGREE EXAMINATION, 2016

(COMMON TO ALL BRANCHES)

(THIRD SEMESTER)

CLEC-301. ENGINEERING MATHEMATICS - II

(Those who joined before 2015-16)

November]

[Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT - I

1. (a) Form the PDE by eliminating a and b from $z = a(x + y) + b$.

(b) Form the PDE by eliminating the arbitrary function ϕ from $\phi\left(\frac{y}{x}, x^2 + y^2 + z^2\right) = 0$.

(c) Solve : $\sqrt{p} + \sqrt{q} = 1$. (15)

2. (a) Solve : $x^2 p + y^2 q = z^2$. (7)

(b) Solve : $\left[D^3 - 7DD^2 - 60I^3 \right] Z = \sin(x + 2y)$. (8)

UNIT - II

3. (a) Obtain the Fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2$. (7)

(b) Obtain the Fourier series expansion of $f(x) = (\pi - x)^2$ in $(0, 2\pi)$. Hence deduce that

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots = \frac{\pi^2}{6}. \quad (8)$$

4. Obtain the Fourier series expansion of $f(x) = |\cos x|$ in $-\pi < x < \pi$. (15)

UNIT - III

5. A tightly stretched string with fixed end points $x = 0$ and $x = l$ is initially in a position given

by $y(x, 0) = y_0 \sin^3 \frac{\pi x}{l}$. If it is released from rest from this position, find the displacement

y at any distance x from one end at any time ' t '. (15)

6. A rod of length l has its ends A and B kept at 0°C and 100°C respectively until steady state conditions prevail. If the temperature of A is suddenly raised to 50°C and that of B to 150°C , find the temperature distribution at any point of the rod and at any time. (15)

UNIT - IV

7. Find the Fourier transform of $f(x)$ given by

$$f(x) = \begin{cases} 1, & \text{if } |x| < a \\ 0, & \text{if } |x| > a \end{cases} \quad \text{and hence, evaluate } \int_0^{\infty} \frac{\sin x}{x} dx \quad \text{and} \quad \int_0^{\infty} \frac{\sin ax \cos ax}{s} ds. \quad (15)$$

8. Find Fourier cosine and sine transforms of e^{-ax} , $a > 0$ and hence, deduce the inverse formula. (15)

UNIT - V

9. (a) Find the z transform of $f(x) = \frac{1}{n(n-1)}$. (7)

(b) Find the $z^{-1} \left[\frac{z}{z^2 + 8z + 7} \right]$ by using partial fraction method. (8)

10. (a) Using Convolution theorem, find $z^{-1} \left[\frac{8z^2}{(2z-1)(4z-1)} \right]$. (7)

(b) Solve the difference equation $y(n+3) - 3y(n+1) + 2y(n) = 0$ given that $y(0) = 4$, $y(1) = 0$, $y(2) = 8$. (8)

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-302 / CSEC-302 / PCSEC-102. MECHANICS OF SOLIDS - I

(Common with Civil and Structural Engineering and Part-Time)

November]

[Time : 3 Hours

Maximum : 75 Marks

(5 × 15 = 75)

Answer ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT - I

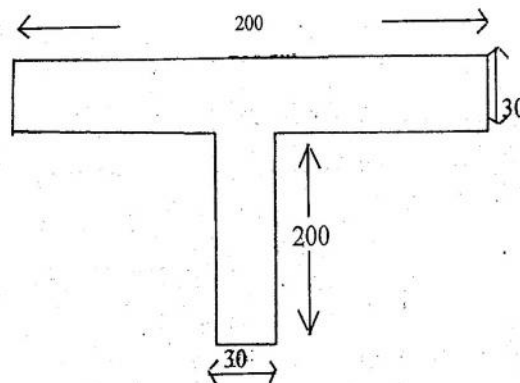
1. Draw stress-strain curve for a mild steel rod subjected to tension and explain about the salient points on it.

(OR)

2. A bar of 25 mm diameter is subjected to a pull of 40 kN. The measured extension on gauge length of 200 mm is 0.085 mm and the change in diameter is 0.003 mm. Calculate the value of Poisson's ratio and the three moduli.

UNIT - II

3. Find out the moment of inertia of the built-up section (figure - 1) about the axis passing through the centre of gravity.

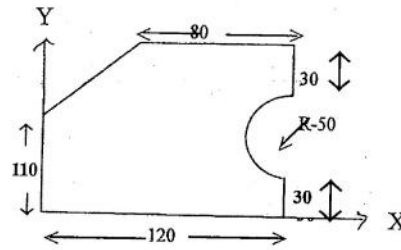


(All dimensions
are in mm)

Figure-1

(OR)

4. Locate the centroid of the area as shown in figure - 2.

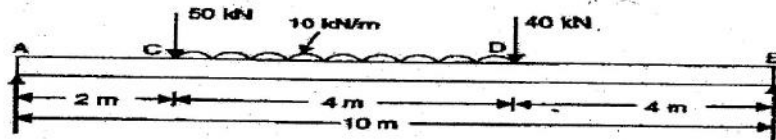


(All dimensions are in mm.)

Figure - 2.

UNIT - III

5. A simply supported beam of length 10 m carries the uniformly distributed load and two point loads as shown in figure - 3. Draw the shear force and bending moment diagram for the beam and also, calculate the maximum bending moment.



(All dimensions are in mm)

Figure - 3.

(OR)

6. A cantilever beam of 2 m long carries a uniformly distributed load of 1.5 kN/m over a length of 1.6 m from the free end. Draw the shear force and bending moment diagrams for the beam.

UNIT - IV

7. A simply supported beam of span 3 m is subjected to a central load of 10 kN. Find the maximum slope and deflection of the beam. Take $I = 12 \times 10^6 \text{ mm}^4$ and $E = 200 \text{ GPa}$.
- (OR)
8. Find the slope and deflection at the free end of the cantilever as shown in figure - 4. Take $EI = 1 \times 10^{10} \text{ kN/mm}^2$.

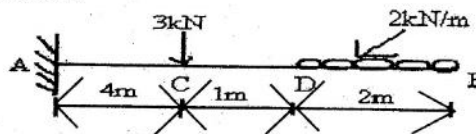


Figure-4

UNIT - V

9. Derive the torsion equation for a circular shaft of diameter 'd' subjected to torque 'T'.

(OR)

10. Find the torque that can be transmitted by a thin tube 6 cm mean diameter and wall thickness 1 mm. The permissible shear stress is 6000 N/cm^2 .

B.E. DEGREE EXAMINATION, 2016

[CIVIL ENGINEERING]

(THIRD SEMESTER)

CLEC - 303 / CSEC - 303. CONSTRUCTION ENGINEERING*(Common with Civil and Structural Engineering)*

November]

[Time : 3 Hours

Maximum : 75 Marks.

*Answer any ONE FULL question from each unit.***UNIT - I**

1. (a) What are the qualities of good bricks? (5)
 - (b) Explain the precautions to be taken in handling lime. What are the uses of lime? (10)
- (OR)
2. Enumerate the laboratory tests for cement and describe any two of them. (15)

UNIT - II

3. (a) What is meant by bearing capacity of soil? (5)
 - (b) Explain any one method of determining bearing capacity of soil in field. (10)
- (OR)
4. Describe about the various types of stone masonry with neat sketches. (15)

UNIT - III

5. Write short notes on the following: (7+8)
 - (a) Madras terrace roofing.
 - (b) Reinforced cement concrete roofing.
- (OR)
6. With neat sketches, explain about the various types of stairs with their application. (15)

UNIT - IV

7. (a) Mention the object of distemping and enumerate its ingredients. How is it applied? (10)
 - (b) What are the properties of distempers? (5)
- (OR)
8. Discuss about the various types of floor finishes, in detail. (15)

UNIT - V

9. What are the various types of crack repair techniques? Explain. (15)
- (OR)
10. What are the methods of repairing structural components at the element level? (15)

B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-304 / PCLEC-104. ENGINEERING GEOLOGY*(Common with Part-Time)*

November]

[Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.**Draw sketches wherever necessary.***UNIT - I**

1. Discuss briefly about the term mineralogy and the process of formation of minerals in nature. (15)

(OR)

2. Describe briefly about the physical properties of the following rock forming minerals :
(a) Quartz. (b) Felspar. (c) Mica. (15)

UNIT - II

3. (a) Discuss briefly about the mode of formation of igneous rocks. (10)
(b) Classify stratified and unstratified rocks. (5)

(OR)

4. (a) Discuss briefly about the mode of formation of sedimentary rocks. (10)
(b) State the properties of marble and genesis. (5)

UNIT - III

5. Describe briefly with neat sketches about the following :
(a) Dip and strike. (b) Folds and its types. (10 + 5)

(OR)

6. Describe briefly about the faults and joints with neat sketches. (15)

UNIT - IV

7. Discuss briefly about the various causes and effects of earth-quakes. (15)

(OR)

8. With neat sketches, explain the various types of land slides. (15)

UNIT - V

9. (a) Discuss briefly about the vertical distribution of ground-water. (9)

(b) Define :

- (i) Aquifer. (ii) Aricrude. (6)

(OR)

10. Discuss briefly about the geological parameters which has to be considered in the construction of dams and reservoirs. (15)

B.E. DEGREE EXAMINATION, 2016

[CIVIL, CIVIL AND STRUCTURAL ENGINEERING]

(THIRD SEMESTER)

CLEC - 305 / CSEC - 306. CONCRETE TECHNOLOGY

November]

[Time : 3 Hours

Maximum : 75 Marks.

*Answer any ONE FULL question from each unit. (5 × 15 = 75)***UNIT - I**

1. Discuss about Indian Standards (IS) specification and the chemical requirements for 33 grade cement. (15)

(OR)

2. (a) Write the general properties of cement. (8)
 (b) Discuss in detail the various types of cement used in construction. (7)

UNIT - II

3. Write in detail the size of aggregates and its classification. (15)

(OR)

4. (a) Write about the surface texture of aggregate in detail. (8)
 (b) Explain the testing procedure of aggregate crushing value. (7)

UNIT - III

5. Describe the testing procedure for conducting slump test in detail. (15)

(OR)

6. What is workability and explain the factors affecting workability of concrete. (15)

UNIT - IV

7. (a) Explain the testing of compressive strength of concrete. (8)

- (b) What are the different types of Non-destructive Testing? Explain any one in detail. (7)

(OR)

8. Write in detail about the chemical admixtures used in concrete. (15)

UNIT - V

9. Discuss in detail the properties of concrete related to mix design. (15)

(OR)

10. Illustrate the mix design of M40 grade concrete. (15)

Register Number:

3500-B

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-306/PCLEC-103. FLUID MECHANICS

(Common with Part Time)

November]

[Time: 3 Hours

Maximum: 75 Marks

Answer any ONE FULL question from each unit (5 × 15 =75)

UNIT - I

1. The velocity profile of a fluid over a plate is parabolic with its vertex 200mm from the plate, where the velocity is 1.2ms. Calculate the velocity gradients and shear stresses at 50 and 200mm from the plate. If the viscosity of the fluid is 0.8 NS/m^2 . (15)
2. Calculate the capillary effect in millimeters in a glass tube of 4mm diameter, when immersed in (i) water and (ii) Mercury of the temperature of the liquid is 20°C and the values of surface tension of water and mercury of 20°C in contact with air are 0.0735 N/m and 0.51 N/m respectively. The contact angle for water $\theta = 0$ and for mercury $\theta = 130^\circ$. Take specific weight of water at 20°C as equal to 9790 N/m^3 and specific gravity of mercury is 13.6. (15)

UNIT - II

3. A 40Cm diameter pipe, conveying water, branches into two pipes of diameters 30Cm and 20Cm respectively. If the average velocity in the 40Cm diameter pipe is 3m/s find the discharge in this pipe: Also determine the velocity in 20Cm pipe. If the average velocity in the 30Cm diameter pipe is 2m/s. (15)
4. A 60° sluice gate is in the form of a circular area of 5m radius. Determine the magnitude and directions of the resultant force on the gate. Also find the location of the resultant force with reference to the circle of which the arc forms a part. (15)

UNIT - III

5. a) Write short notes on: (8)
 - i) Steady and unsteady
 - ii) Rotational and irrotational
 - iii) Pathlines and streamlines.
- b) Prove that, for potential flow, both the stream and velocity potential. Satisfy the Laplace equation. (7)

6. A pipe having varying diameter from 30Cm to 20Cm is used to carry oil of specific gravity 0.85. The pressure head at the inlet is 750N/Cm^2 . The discharge through the pipe is 3200 lpm. Determine the pressure head at outlet and velocity at the inlet and outlet. Assume the pipe is kept horizontal and loss of head between inlet and outlet is neglected. (15)

UNIT – IV

7. a) Determine the friction loss in the pipe of 400m long and 200mm diameter when the discharge is $3\text{m}^3/\text{min}$ and the resistance co-efficient $f = 0.01$. (8)
- b) Derive the Darcy-Misbech equation. (7)
8. a) At a sudden enlargement of water main from 240mm to 480mm diameter, the hydraulic gradient rises by 10mm. Estimate the rate of flow. (10)
- b) What are various minor losses involved pipe network. (5)

UNIT – V

9. Find the discharge through a circular pipe of diameter is 9.0m, if the depth of water in the pipe is 6m and its laid at a slope of I in 1500. Take the value of Chezy's constant = 80. (15)
10. Explain the classification of hydraulic jump with a neat sketch. (15)

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