Register Number :

Name of the Candidate :

8 5 2 4

B.E. DEGREE EXAMINATION, 2011

(COMMON TO ALL BRANCHES)

(THIRD SEMESTER)

CLEC - 301 : MATHEMATICS - III

(Old Regulations)

(For the students joined during 2006-07 and before)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE full question from each unit.

All questions carry equal marks.

UNIT - I

1. (a) Find the Fourier series of

$$f(x) = x^2 \text{ in } (-\pi, \pi)$$

(b) Obtain the sine series of $f(x) = c$ in $(0, \pi)$

Turn Over

2. (a) Find the complex form of Fourier series of

$$f(x) = e^x \text{ in } -1 \le x \le 1.$$

(b) Obtain the cosine series of

$$f(x) = x \operatorname{Sin} x \text{ in } 0 < x < \pi.$$

UNIT – II

3. (a) Form the PDE by eliminating arbitrary functions from

$$z = f(2x + 3y) + g(2x + y)$$

(b) Solve :

$$\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = 11 \operatorname{Sin}(2x + 3y)$$

4. (a) Solve : $z^2 (p^2 + q^2 + 1) = c^2$.

(b) Solve : $x^2 (y - z) p + y^2 (z - x) q = z^2 (x - y)$

UNIT – III

5. (a) Find : $L^{-1}\left(\frac{3s+1}{(s-1)(s^2+1)}\right)$

(b) Find the Laplace transform of :

(i) $\frac{\operatorname{Cos} 2t - \operatorname{Cos} 3t}{t}$

(ii) $t e^{-t} \operatorname{Cosh} 2t$

6. (a) Find the Laplace transform of :

(i) $t e^{-t} \operatorname{Sin}^2 t$

(ii) $\frac{e^{-at} - e^{-bt}}{t}$

(b) Using Laplace transform, solve :

$(D^2 + 4D + 4) y = \operatorname{Sin} t,$

$y(0) = 2, y'(0) = 0$

UNIT – IV

7. (a) Show that $f(z) = \log z$ is analytic and find its derivative.

(b) Find the bilinear transformation that maps the pointer $z = 0, 1, \infty$ into $\omega = i, 1, -i$ respectively.

8. (a) Find the image of the circle $|z - 1| = 1$ in the complex plane under the mapping $w = \frac{1}{z}$

(b) Prove that the function

$u = 3x^2y + x^2 - y^3 - y^2$ is harmonic, find the conjugate harmonic.

UNIT – V

9. (a) Using Cauchy's integral formula, evaluate :

$$\int_c \frac{z+4}{z^2+2z+5}\,dz,$$

where c is the circle $|z + 1 + i| = 2$.

(b) Find the Laurent's series of

$$f(z) = \frac{Z}{(Z^2+1)(Z^2+4)} \text{ in } 1 < |z| < 2.$$

10. (a) Evaluate $\int_0^{2\pi} \frac{d\theta}{2+\cos\theta}$,

using Contour integration.

(b) Evaluate $\int_0^{\infty} \frac{x^2\,dx}{(x^2+9)(x^2+4)}$,

using Contour integration.

Register Number :

Name of the Candidate :

8 5 3 1

B.E. DEGREE EXAMINATION, 2011

(COMMON TO ALL BRANCHES)

(THIRD SEMESTER)

CLEC-301. ENGINEERING MATHEMATICS - II

(New Regulations)

(For the students joined during 2007-2008 and after)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer ONE question from each unit.
All question carry equal marks.

UNIT – I

1. (a) Form the PDE from

$$z = f(x^2 + y) + g(x^2 - y) \qquad (6)$$

Turn Over

(b) Solve : (6)

$$(y^2 + z^2 - x^2)\, p - 2xyq + 2\, zx = 0$$

2. (a) Solve : (6)

$$(D^2 - 3DD' + 2D'^2)z = e^{3x+4y} + \text{Sin}\,(4x - 3y)$$

(b) solve : $z^2\,(p^2x^2 + q^2) = 1$ (6)

UNIT – II

3. (a) Expand $f(x) = x^2$ as a Fourier series in $(-\pi, \pi)$ (6)

(b) Obtain the half range Cosine series of the function (6)

$$f(x) = \begin{cases} Kx : 0 < x < \frac{l}{2} \\ K(l - x) : \frac{l}{2} < x < l. \end{cases}$$

4. (a) Obtain the Fourier series of (6)

$$f(x) = x + x^2 \text{ in } (-1, 1).$$

(b) Find the complex form of the Fourier series for $f(x) = e^{ax} : -\pi < x < \pi$. (6)

UNIT – III

5. An uniform elastic string of length 60 cms is subjected to a constant tension of 2 kg. If the ends are fixed and the initial displacement is $60\,x - x^2 : 0 \leq x \leq 60$, while the initial velocity is zero, find the displacement of the string. (12)

6. A metal bar 10 cm long with insulated sides, has its ends A and B kept at $20^\circ C$ and $40^\circ C$ until steady state conditions prevail. The temperature at A is suddenly raised to $50^\circ C$ and B is lowered to $10^\circ C$. Find the temperature distribution. (12)

UNIT – IV

7. (a) Find the Fourier integrate of : (6)

$$f(x) = \begin{cases} 0 & : x < 0 \\ \frac{1}{2} & : x = 0 \\ e^{-x} & : x > 0 \end{cases}$$

(b) Find the Fourier Cosine transform of e^{-ax} Cos ax. (6)

8. (a) Find the Fourier transform of

$e^{-a|x|}$, $a > 0$. (6)

(b) State and prove the Parseval's identity on Fourier transform. (6)

UNIT – V

9. Using Z – transform, solve :

(a) $y_{n+2} + 6y_{n+1} + 9y_n = 2^h$, $y_0 = y_1 = 0$. (6)

(b) Using Convolution theorem, find

$$Z^{-1}\left(\frac{z^2}{(z-a)(z-b)}\right) \quad (6)$$

10. (a) Find the Z-transform of (6)

(i) n^k

(ii) $r^n \cos n\theta$

(b) State and prove the Final Value Theorem on Fourier transform. (6)

(c) A closed coiled helical spring made of 10 mm diameter steel wire has 15 coils of 100 mm mean diameter. The spring is subjected to an axial load of 100 N. Calculate :

(i) The maximum shear stress induced.

(ii) The deflection

and (iii) Stiffness of the spring.

Take modulus of rigidity

$C = 8{\cdot}16 \times 10\ N^4/mm^2$. (5)

Register Number :

Name of the Candidate :

8 5 2 5

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(THIRD SEMESTER)

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

(Old & New Regulations)

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE FULL question from each unit.

All questions carry equal marks.

UNIT I

(a) Define modular ratio. (2)

(b) Find the minimum diameter of steel wire which is used to raise a load of 4,000 N, if the stress in the rod is not to exceed 95 MN/m^2. (3)

Turn Over

(c) A steel rod of 3 cm diameter is enclosed centrally in a hollow copper tube of external diameter 5 cm and the internal diameter of 4 cm. The composite bar is then subjected to an axial pull of 45,000 N. If the length of each bar is equal to 15 cm. Determine

(i) The stresses in the rod and tube.

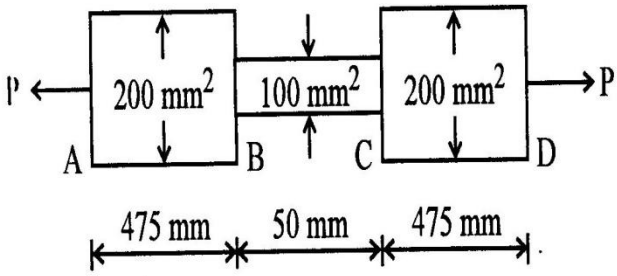
and (ii) Load carried by each bar.

Take E for steel = $2{\cdot}1 \times 10^5$ N/mm^2 and for copper = $1{\cdot}1 \times 10$ N^5/mm^2. (7)

2. (a) Define strain energy and modulus of resilience. (2)

(b) A steel rod is 2 m long and 50 mm in diameter. An axial pull of 100 KN is suddenly applied to the rod. Calculate the instantaneous stress induced and also instantaneous elongation produced in the rod. Take E = 200 GN/m^2. (3

(c) The maximum stress produced by a pull in a bar of length 1 m is 150 N/mm^2. The area of cross sections and length are shown in figure. Calculate the strain energy stored in the bar, if E = 2×10 N^5/mm^2. (7)

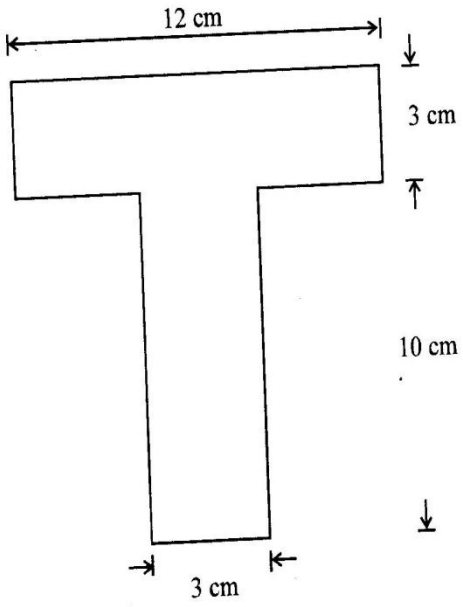


UNIT – II

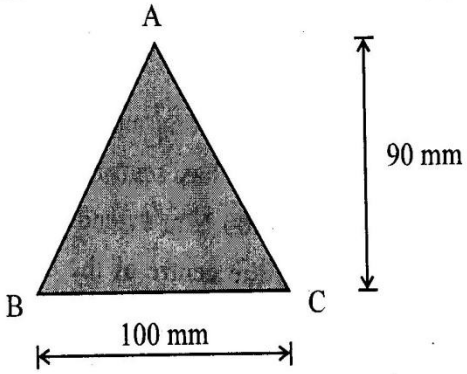
3. (a) Define the term moment of Inertia and radius of gyration. (3)

(b) Derive an expression for the moment of inertia of a triangular section about an axis passing through the centre of gravity of the section and parallel to the base. (6)

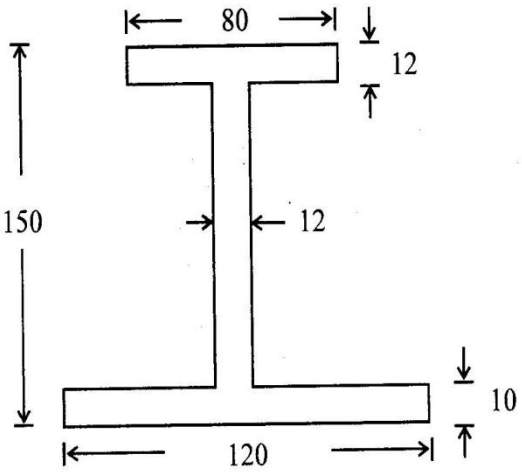
(c) Find the centre of gravity of the T-section shown in fig. (3)



4. (a) Determine the moment of Inertia of the section about an axis passing through the base 'BC' of a triangular section shown in figure. (2)



(b) Determine the polar moment of Inertia of I-section shown in figure. (All dimensions are in mm) (10)



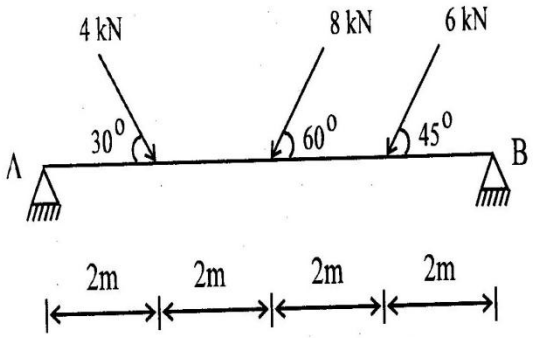
UNIT – III

5. (a) Draw the sheer force and bending moment diagram for a cantilever beam of length 'L' carrying a uniformly distributed load 'W' upto the free end. (4)

   (b) A beam 10 m long and simply supported at each end, has a uniformly distributed load of 1,000 N/m extending from the left end upto the centre of the beam. There is also an anticlockwise couple of 15 KNm at a distance of 2·5 m from the right end. Draw the sheer force and bending moment diagrams. (8)

6. (a) What are the different types of load acting on a beam? Differentiate between a point load and a uniformly distributed load. (4)

   (b) A horizontal beam AB of length 8 m is hinged at A and placed on roller at B. The beam carries three inclined point loads as shown in figure. Draw the shear force and bending moment diagrams and also axial force diagram of the beam. (8)



UNIT – IV

7. (a) A beam 6 m long simply supported at its ends, is carrying a point load of 50 KN at its centre. The moment of Inertia (I) of the beam is given as equal to 78×10^6 mm^4. If 'E' for the material of the beam = $2{\cdot}1 \times 10^5$ N/mm^2. Calculate :

   (i) Deflection at the centre of the beam

   and (ii) Slope at the supports. (6)

   (b) A beam of length 5 m and of uniform rectangular section is supported at its ends and carries uniformly distributed load over the entire length. Calculate the depth of the

section, if the maximum permissible bending stress is 8 N/mm^2 and central deflection is not to exceed 10 mm. (6)

8. (a) Prove that the deflection at the centre of a simply supported beam, carrying a point load at the centre is given by

$$y_c = \frac{WL^3}{48\,EI}$$

where, W = point load

and L = length of the beam. (4)

(b) A beam of length 6 m is simply supported at its ends and carries two point loads of 48 KN and 40 KN at a distance of 1 m and 3 m respectively from the left support. Find :

(i) Deflection under each load.

(ii) Maximum deflection.

(iii) The point at which maximum deflection occurs.

Take $E = 2 \times 10\ N^5/mm^2$

and $I = 85 \times 10^6\ mm^4$. (8)

UNIT – V

9. (a) Define the term polar modulus. Find the expression for polar modulus for a solid shaft and for a hollow shaft. (4)

(b) Determine the diameter of a solid shaft which will transmit 300 KN at 250 rpm. The maximum shear stress is not to exceed 30 N/mm^2 and twist should not be more than 1^o in a shaft length of 2 m. Take modulus rigidity = $1 \times 10\ N^5/mm^2$. (8)

10. (a) Define helical springs. Name the two important types of helical springs. (3)

(b) A closed coil helical spring is to carry a load of 500 N. Its mean coil diameter is to be 10 times that of the wire diameter. Calculate these diameters, if the maximum shear stress in the material of the spring is to be 80 N/mm^2. (4)

Register Number: **8526**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-303. CONSTRUCTION MATERIALS AND TECHNOLOGY

(Old Regulations)

(For the students joined during 2006-07 and before)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any one full Question from each unit

UNIT-I

1. a) What are the advantages of using stones in stone masonry? (6)

   b) What are the characteristics of good bricks? (6)

2. a) What are the constituents of Portland cement? (6)

   b) Discuss the various types of timber used for buildings. (6)

UNIT-II

3. a) Mention the different types of pile foundation. (6)

   b) Explain with neat sketches of any two shallow foundation. (6)

4. a) Discuss the various methods of improving the bearing capacity of soils. (6)

   b) What are the different types of brick masonry? Draw with neat sketch. (6)

UNIT-III

5. a) List the different types of stairs. Explain any one with neat sketch. (6)

   b) What are the requirements of good stair? (6)

6. a) Draw a neat sketch of a paneled door combined with fan light at top to illustrate different parts of a door. (6)

   b) What is dampness in building? Briefly explain the termite proofing. (6)

UNIT-IV

7. a) What are the types of lintels? Explain with neat sketch. (6)

   b) What are the strengthening methods adopted for repairing concrete structures? (6)

8. What are the points you will observe while supervising an underground R.C. C. work? (12)

UNIT-V

9. a) Discuss in detail about the pit method and pile method of underpinning. (6)

   b) Describe the different types of pointing with neat sketch. (6)

10. a) What are the objectives of plastering? (6)

    b) Describe the various types of paints, and their suitability or use. (6)

UNIT-III

5. Write short notes on the following:
   i)Dip ii)Strike iii) Folds iv) Faults (12)

6. How are unconformities formed? Briefly explain th various types of unconformity. (12)

UNIT-IV

7. Explain in detail the seismic methods used in the civi engineering investigations. (12)

8. Write notes on "Landslides" and give an account o the measures adopted to prevent the slides. (12)

UNIT-V

9. What are the geological conditions influencing th site selection for a Dam? (12)

10. Explain the various geological investigations fo tunneling and the methods of tunnel excavation i rocks. (12)

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Register Number: **8527**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-304/PCLEC-104.ENGINEERING GEOLOGY
(Old Regulation)
(For the students joined during 2006-07 and before)

May) (Time: 3 Hours

Maximum: 60 Marks

Answer any ONE FULL question from each unit
All questions carry equal marks

UNIT-I

1. Give a detailed account of the types, properties, behaviour and engineering significance of rock minerals. (12)

2. Classify the silicate minerals into various groups. Explain the structure of each group in detail. (12)

UNIT-II

3. Enumerate the important igneous rock and give their distinguishing characters. (12)

4. Describe in detail the textures and structures of sedimentary rocks. (12)

4. Explain the different methods of determining average rainfall over a catchments due to a st Discus the relative merits and demerits of the var methods.

UNIT-III

5. a) What is evaporation? Mention the fac controlling the evaporation process.

   b) Discuss the use of pan measurements for determination of evaporation form water surface.

6. a) What do you understand by the term: infiltrati How can you measure it in the filed?

   b) Explain the terms: Infiltration capacity Infiltration rate.

UNIT-IV

7. a) Explain the stream flow measurement by velocity method.

   b) Briefly explain the factors that affect the run from a basin.

8. a) Sketch a typical hydrograph resulting form isolated storm and identify the features of same.

   b) What is instantaneous unit hydrograph (IV What are its characteristics?

UNIT-V

9. a) What are the basic equations used for flood rou by hydrologic method and hydraulic method?

   b) What are the limitations of flood frequency studi

10. Describe the mustingum method of routing an inf hydro graph through a channel reach.

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Register Number: **9163**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(THIRD SEMESTER)

PCLEC-304. HYDROLOGY

(New Regulation)

(Time: 3 Hours

Maximum: 60 Marks

Answer any ONE FULL question from each unit

UNIT-I

1. Explain the hydrologic cycle with a neat sketch. Tabulate the various process and storages involved in the system.

2. a) What are the significant features of global water balance studies?

   b) State the five potential water using departments of the Country and explain the hydrological responsibilities.

UNIT-II

3. a) Describe the various forms of precipitation.

   b) What is a rain gauge? What are its uses?

Register Number :

Name of the Candidate :

8535

B.E. DEGREE EXAMINATION, 2011

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC - 306 / PCLEC - 103.
FLUID MECHANICS

(New Regulations)

(For the students joined during 2007-08 and after)

May] [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE full question from each unit.

All questions carry equal marks.

UNIT - I

1. (a) State the Newton's law of viscosity. (4)

Turn Over

(b) Distinguish between ideal fluids and real fluids. Explain the importance of compressibility in fluid flow. (8)

(OR)

2. (a) Derive an expression for capillary rise of a liquid. (4)

(b) Describe in detail about the construction and working principle of an inclined manometer with a neat diagram. (8)

UNIT - II

3. (a) Obtain an expression for the pressure intensity at a point in a fluuid. (4)

(b) A body of dimensions 1·5 × 1·0 × 2·0 m weighs 1962 N in water. Find its weight in air. What will be its specific gravity? (8)

(OR)

4. (a) Define metacentre. (4)

(b) A pipe line which is 4 m in diameter contains a gate valve. The pressure at the centre of the pipe is 19·6 N/cm^2. If the

pipe is filled with oil of specific gravity 0·87, find the force exerted by the oil upon the gate and position of centre of pressure. (8)

UNIT - III

5. (a) Derive Bernoulli's equation. (6)

(b) Describe in detail about the compressible flow. (6)

(OR)

6. (a) Define hydraulic gradient line. (2)

(b) Derive Euler's equation of motion along a stream line for an ideal fluid, stating clearly the assumptions. Explain how this is integrated to get Bernoulli's equation along a stream line. (10)

UNIT - IV

7. (a) What is a compound pipe? What are all the losses of head when pipes are connected in series? (4)

(b) A pipe 200 m long has a slope of 1 in 100 and tapers from 1·2 m diameter at a high end to 0·6 m diameter at the low end and carries 100 lps of oil (sp.gravity = 0·8) if the pressure gauge at the higher end reads 60 kN/m^2, determine

(i) Velocities at the two ends

and (ii) Pressure at the lower ends.

Neglect all losses. (8)

(OR)

8. (a) What do you mean by 'equivalent pipe' and flow through parallel pipes ? (4)

(b) Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of flow of water through the pipe is 250 lps.(8)

UNIT - V

9. (a) Explain the term most economical section of a channel. (4)

(b) Find the discharge through a rectangular channel of width 2 m, having a bed slope of 1 in 2,000. The depth of flow is 1·5 m and take the value of N in Manning's formula as 0·012. (8)

(OR)

10. A rectangular channel carrying a discharge of 2 m^3/sec per metre width. If the loss of energy in the hydraulic jump is found to be 2·75 m, determine the conjugate depths before and after the jump. (12)

6. What are Admixtures? State the admixture used for improving Workability and Durability. Explain the chemistry of reaction with concrete.

UNIT-IV

7. Find out the mix proportioning of M grade concrete using ACT method. Assume relevant data suitably.

8. Explain the procedure for finding the mix proportioning by IS code method.

UNIT-V

9. Write short notes on the following
   i. Fibre reinforced concrete
   ii. Super plasticized concrete
   iii. Polymer cement concrete

10. Explain the properties of high performance concrete.

[redacted] Number: **8530**

[redacted] of the Candidate:

9

B.E. DEGREE EXAMINATION, 2011

VII., CIVIL AND STRUCTURAL ENGINEERING)

(THIRD SEMESTER)

CLEC-307. CONCRETE TECHNOLOGY

(Old Regulations)

(For the students joined during 2006-07 and before)

[Time : 3 Hours

Maximum : 60 Marks

Answer any one full Question from each unit

UNIT-I

What are the various classes of bricks available? Explain with specifications.

Explain the Chemical composition and Hydration process of cement.

UNIT-II

Explain the operating principle of belt conveyor system with neat sketch.

What are factors to be considered while selecting a ready mix concrete mixing plant? Explain.

UNIT-III

What are the factors affecting Workability? Explain in detail.