

Register Number :

Name of the Candidate :

0 1 2 0

**B.E. DEGREE EXAMINATION, 2016**

( CIVIL ENGINEERING )

( THIRD SEMSTER )

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

( Common with Civil and Structural and Part-Time )

May ]

[ Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

**UNIT - I**

1. Derive the relationship between the elastic constants from fundamental principles.

(OR)

2. A bar of 30 mm diameter is subjected to a pull of 50 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 about the axis passing through the centre of gravity ( Figure-1).

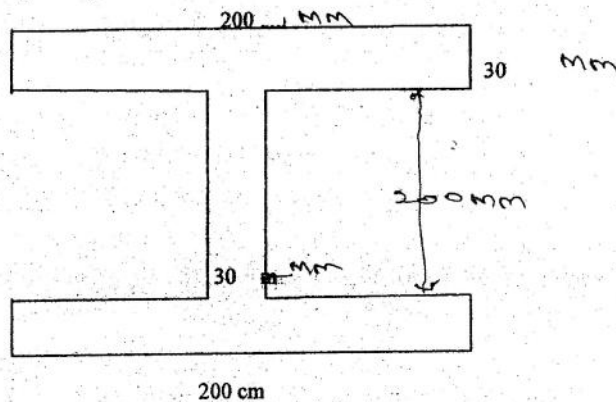


Figure-1

(OR)

4. Determine the mass moment of inertia of a solid cylinder of radius  $R$  and length  $L$ . Let the density of material be  $\rho$ .

### UNIT - III

5. Draw the shear force and bending moment diagram for the beam given in figure-2.

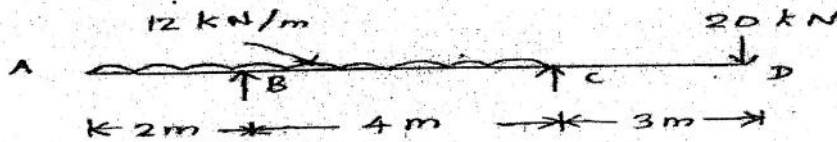


Figure-2

(OR)

6. State the assumptions made in the theory of simple bending and derive the bending formula.

### UNIT - IV

7. 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 :

(a) Deflection under each load. (b) Maximum deflection.

(c) The point at which the maximum deflection occurs.

Take  $I = 85 \times 10^6 \text{ mm}^4$  and  $E = 2 \times 10^5 \text{ N/mm}^2$ .

(OR)

8. A simply supported beam of span 5 m is subjected to a central load of 20 kN. Find the maximum slope and deflection of the beam. Take  $I = 12 \times 10^6 \text{ mm}^4$  and  $E = 200 \text{ GPa}$ .

### UNIT - V

9. A close coiled helical spring is made of a round wire having ' $n$ ' turns and the mean coil radius  $R$  is 5 times the wire diameter. Show that the stiffness of the spring =  $2.05 R/n$ . If the above spring is to support a load of 1.2 kN with 12 mm compression, calculate the mean radius of the coil and the number of turns assuming  $G = 82000 \text{ N/mm}^2$  and permissible shear stress  $\tau = 250 \text{ N/mm}^2$ .

(OR)

10. A circular shaft of 1000 mm diameter and 2 m length is subjected to a twisting moment which creates a shear stress of  $20 \text{ N/mm}^2$  at 30 mm from the axis of the shaft. Calculate the angle of twist and the strain energy stored in the shaft. Take  $G = 8 \times 10^4 \text{ N/mm}^2$ .

**B.E. DEGREE EXAMINATION, 2016**

( CIVIL ENGINEERING )

( THIRD SEMESTER )

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

May]

[Time : 3 Hours

Maximum : 75 Marks.

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

1. What are the various tests conducted on cement? Explain in detail. (15)  
(OR)
2. (a) Write the properties of good brick earth. (5)  
(b) Explain about the manufacturing of bricks. (10)

**UNIT - II**

3. Explain with the help of sketches, various types of shallow foundation. (15)  
(OR)
4. (a) What are the criteria to be considered for determining minimum depth of foundation. (5)  
(b) Explain the method of forming cast in situ pressure pile. (10)

**UNIT - III**

5. Classify with the help of sketches, various types of windows based on their method of operation or opening. (15)  
(OR)
6. (a) Explain how pre-construction anti-termite treatment is carried out. (8)  
(b) Discuss various modes of failures of an arch. (7)

**UNIT - IV**

7. (a) Discuss the various types of pointing. (10)  
(b) What are the ill effects of dampness in buildings? (5)  
(OR)

8. (a) Explain in brief the factors that affect the selection of floor finish. (5)  
(b) Explain with reasons what type of floor finishing will be required for  
(i) dancing hall (ii) ware house. (10)

**UNIT - V**

9. What are the various causes of distress in concrete structures. (15)  
(OR)
10. (a) What are the preventive measures to be taken for demolition works? (5)  
(b) Explain about the strengthening methods of concrete columns. (10)

**B.E. DEGREE EXAMINATION, 2016**

(CIVIL ENGINEERING)

(THIRD SEMESTER)

**CLEC-304 / PCLEC-104. ENGINEERING GEOLOGY**

(Common With Part-Time)

May]

[ Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

**UNIT - I**

- 1. (a) Briefly describe about the minearl group which is most common in occurence. (10)
  - (b) Give the physical properties of pyroxene. (5)
- (OR)
- 2. Briefly discuss the physical properties of the following minerals : (15)
  - (a) Garnet. (b) Epidote. (c) Beryl.

**UNIT - II**

- 3. Discuss briefly about the geological, physical and chemical classifications of rocks. (15)
- (OR)
- 4. Give the properties for the following rocks : (15)
  - (a) Granite. (b) Syenite. (c) prnice. (d) Shale. (e) Sandstone.

**UNIT - III**

- 5. Discuss briefly about the various types of folds and faults with neat sketches. (15)
- (OR)
- 6. Write short notes on the following : (15)
  - (a) Unconformities. (b) Overlap. (c) Ortelier.

**UNIT - IV**

- 7. (a) Discuss briefly about the seismic zones of India. (10)
  - (b) With neat sketch, explain a seismograph. (5)
- (OR)

- 8. Briefly describe about the causes of landslides. Also, state the methodologies adopted in the prevention of landslides. (15)

**UNIT - V**

- 9. (a) Describe briefly about the various types of aquifers. (10)
  - (b) Define : (5)
  - (i) Aquifuge. (ii) Aquitard.
- (OR)
- 10. Discuss the various geological investigations to be made before proposing tunnel alignments. (15)

**B.E. DEGREE EXAMINATION, 2016**

( CIVIL ENGINEERING )

( THIRD SEMESTER )

**CLEC - 305 / CSEC - 306. CONCRETE TECHNOLOGY***( Common with Civil and Structural Engineering )*

May ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.**Relevant IS codes may be permitted.***UNIT - I**

1. Describe the procedure for determining consistency and setting time of cement.

(OR)

2. Discuss about the hydration of cement with their reaction products & its significance.

**UNIT - II**

3. Write explanatory notes on:

i) uniform grading ii) gap grading iii) continuous grading with neat sketches.

(OR)

4. Describe the importance of quality of water used for concreting.

**UNIT - III**

5. Discuss about the various methods of transporting concrete.

(OR)

6. Explain any two methods of determining workability of concrete in field.

**UNIT - IV**

7. Describe about the drying shrinkage and creep of concrete.

(OR)

8. (a) Discuss about the role of mineral admixtures on strength and durability of concrete.

(b) write short notes on:

(i) fly-ash. (ii) silica fume.

**UNIT - V**

9. (a) Compare ACI method and IS code method of mix proportioning of concrete.

What are the various methods of mix proportioning?

(OR)

10. Write the step by step procedure for proportioning of concrete mix using ACI method.

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(THIRD SEMESTER)

**CLEC-306 / PCLEC-103. FLUID MECHANICS**

(Common with Part-Time)

May ]

[ Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

**UNIT - I**

1. Two plates are placed at a distance of 0.15 mm apart. The lower plate is fixed while the upper plate having surface area  $1.0 \text{ m}^2$  is pulled at 0.3 m/s. Find the force and power required to maintain this speed, if the fluid separating them is having viscosity 1.5 Poise.

(OR)

2. Determine the bulk modulus of elasticity of a fluid which is compressed in a cylinder from a volume of  $0.009 \text{ m}^3$  at  $70 \text{ N/cm}^2$  pressure to a volume of  $0.0085 \text{ m}^3$  at  $270 \text{ N/cm}^2$  pressure.

**UNIT - II**

3. A U-tube differential manometer connects two pressure pipes A and B. Pipe-A contains carbon tetrachloride having a specific gravity 1.594 under a pressure of  $11.772 \text{ N/cm}^2$  and pipe-B contains oil of specific gravity 0.8 under a pressure of  $11.772 \text{ N/cm}^2$ . The pipe-A lies 2.5 m above pipe-B. Find the difference of pressure measured by mercury as fluid filling U-tube.

(OR)

4. A rectangular plane surface 1 m wide and 3 m deep lies in water in such a way that its plane makes an angle of  $30^\circ$  with the free surface of water. Determine the total pressure and position of centre of pressure when the upper edge of the plate is 2 m below the free water surface.

**UNIT - III**

5. A fluid flow is given by  $V = xy^2 \mathbf{i} - 2yz^2 \mathbf{j} - \left( zy^2 - \frac{2z^3}{3} \right) \mathbf{k}$ . Prove that it is a case of possible steady incompressible fluid flow. Calculate the velocity and acceleration at the point (1, 2, 3).

(OR)

6. State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend?

UNIT - IV

7. A horizontal pipe line 50 m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 30 m of its length from the tank, the pipe is 200 mm diameter and its diameter is suddenly enlarged to 400 mm. The height of water level in the tank is 10 m above the centre of the pipe. Considering all minor losses, determine the rate of flow. Take  $f = 0.01$  for both sections of pipe.

(OR)

8. A pipe of diameter 25 cm and length 2000 m connects two reservoirs, having difference of water level 25 m. Determine the discharge through the pipe. If an additional pipe of diameter 25 cm and length 1000 m is attached to the last 1000 m length of the existing pipe, find the increase in discharge. Take  $f = 0.016$ . Neglect minor losses.

UNIT - V

9. (a) Derive the condition for the best side slope of the most economical trapezoidal channel. (8)

- (b) Find the side slope in a trapezoidal section of maximum efficiency which will carry the same flow as a half square section of the same. (7)

(OR)

10. Find the discharge through a trapezoidal channel of width 6 m and side slope of 1 horizontal to 3 vertical. The depth of flow of water is 3 m and Chezy's constant  $C = 60$ . The slope of the bed of the channel is given 1 in 5000.