

Register Number :

Name of the Candidate :

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**B.E. DEGREE EXAMINATION, 2015**

(FIRST YEAR)

**101. TECHNICAL ENGLISH**

(Common with ALL BRANCHES)

November ]

[ Time : 3 Hours

Maximum : 75 Marks

Answer ONE FULL questions from each unit.

ALL questionas carry EQUAL Marks.

**UNIT - I**

1. Discuss the significant traits and different methods of listening. (15)

(OR)

2. What are the barriers to listening and suggest remedies to overcome them ? (15)

**UNIT - II**

3. (a) Explain the falling intonation with examples. (5)

(b) Transcribe the following words : (5)

(i) Absolute. (ii) Black bird. (iii) Question. (iv) Language. (v) Symbol.

(c) Separate the following words into syllables and mark the primary stress : (5)

(i) Present. (ii) Anxious. (iii) Educate. (iv) Mechanic. (v) Politics.

(OR)

4. (a) Discuss the rising intonation with examples. (5)

(b) Transcribe the following words : (5)

(i) Necessity. (ii) Canteen. (iii) Special. (iv) Migrate. (v) Progress.

(c) Separate the following words into syllables and mark the primary stress : (5)

(i) Perfect. (ii) Increase. (iii) Cultivate. (iv) Absentee. ((v) Degrade

## UNIT - III

*Read the following passage carefully and answer briefly to the questions given below:(15)*

Dublin lay enveloped in darkness. Around the beleaguered Four Courts the heavy guns roared. Here and there through the city, machine guns and rifles broke the silence of the night, spasmodically, like dogs barking on lone farms. Republicans and Free Stators were waging Civil War.

On a roof-top near O'Connell Bridge, a republican sniper lay watching. Beside him lay his rifle and over his shoulders were slung a pair of field glasses. His face was the face of a student. thin and ascetic, but his eyes had the cold gleam of the fanatic. They were deep and thoughtful, the eyes of a man who is used to look at death.

He was eating a sandwich hungrily. He had eaten nothing since morning. He had been too excited to eat. He finished the sandwich, and taking flask of whisky from his pocket, he took a short draught. Then he returned the flask to his pocket. he paused for a moment, considering whether he should risk a smoke. It was dangerous. The flash might be seen in the darkness and there were enemies watching. But he decided to take the risk.

Placing a cigarette between his lips, he struck a match. There was flash and a bullet whizzed over his head. ~~he dropped immediately. He has seen the flash. it came from the~~ opposite side of the street.

He rolled over the roof to a chimney stack in the rear, and slowly drew himself behind it, until his eyes were level with the top of the parapet. There was nothing to be seen - just the dim outline of the opposite house-top against the blue sky. His enemy was under cover. Just then an armoured car came across the bridge and advanced slowly up the street. It stopped on the opposite side of the street, fifty yards ahead. The sniper could hear the dull panting of the motor. His heart beats faster. It was an enemy car. He wanted to fire, but he knew it was useless. His bullets would never pierce the street that covered the gray monster.

Then round the corner of a side street came an old woman, her head covered with a tattered shawl. She began to talk to the man in the turret of the car. She was pointing to the roof where the sniper lay. An informer.

The turret opened. A man's head and shoulders appeared, looking toward the sniper. The sniper raised his rifle and fired. The head fell heavily on the turret wall. The woman darted toward the side street. The sniper fired again.

The woman whirled round and fell with a shriek into the gutter.

*Questions :*

- (a) What was the sniper doing on the roof-top near O'Connell Bridge ?
- (b) Who was the informer and what happened to her ?

- (c) After eating, what did the sniper decide to do and what happened?
- (d) What were the forces engaged in the civil war in Dublin?
- (e) Describe briefly the face and the look of the sniper.

(OR)

6. *Read the following passage and make notes on it:* (15)

A line organization is one in which there is a direct flow of authority from the top executive to the rank and file-employee, usually through several lesser executives at various managerial levels. It is sometimes called the military type because each person has someone immediately over him. Although modern armies have become too complex to rely exclusively on a line organization, they still use the direct chain of command.

There are many advantages inherent in this form. It is simple and easy to understand. Responsibility is clearly defined and each worker, regardless of his rank, reports to but one individual. This simplifies discipline. Decisions can usually be rendered quickly and executives must produce or be replaced. As long as each employee carries out the orders of his immediate superior, he is relatively free from criticism, which makes for harmonious working conditions.

There are, however many disadvantages to the line type of organization. Each superior needs to be a master of many diverse angles to his job. He should be able to handle his men keep the machines running, invent new processes, recommend pay increases and train new employees. Frequently he may be outstanding at one or two of his numerous responsibilities and very poor at others. The line organization also has the disadvantages of placing so much final authority and direction at the top that the individual concerned, instead of devoting his attention to working out important matters of policy and general practices, finds most of his devoted to reading reports and rendering decisions on operating problems. Coordination of the different 'lines' is difficult to achieve, particularly in a complex, large industry.

#### UNIT - IV

7. Write a letter to the Managing Director of State Transport Corporation, requesting him to provide additional bus services to your area. (15)

(OR)

8. You have been asked by a firm which manufactures detergent soap to make a study of the consumer reaction to their product and suggest measures to improve the image and sales of their product. Prepare a report of the study. (15)

## UNIT - V

9. (a) Match words : (2)

- Sombre - Threat.  
 Volatile - Kind.  
 Benign - Serious.  
 Menace - Unstable.

(b) Fill in the blanks with suitable articles : (2)

- (i) March is \_\_\_\_\_ third month of year.  
 (ii) The doctor says it is \_\_\_\_\_ hopeless case.  
 (iii) He returned after \_\_\_\_\_ hour.  
 (iv) Dog is \_\_\_\_\_ faithful animal.

(c) Fill in blanks with suitable prepositions : (2)

- (i) The policeman is \_\_\_\_\_ duty.  
 (ii) He spent his entire life \_\_\_\_\_ Calcutta.  
 (iii) Beware \_\_\_\_\_ mad dogs.  
 (iv) She laughed \_\_\_\_\_ my face.

(d) Add a suitable question tag to the following : (2)

- (i) I have never had much patience.  
 (ii) Everybody held his breath and waited.

(e) Fill in the blanks with suitable verbs : (3)

- (i) If it rains this evening, I \_\_\_\_\_ (not go) out.  
 (ii) We \_\_\_\_\_ (go) to Singapore next March.  
 (iii) I \_\_\_\_\_ (clean) the gate later this afternoon.

(f) Rewrite as directed : (4)

- (i) Who taught you English ? (Change into Passive.)  
 (ii) Let the poor be helped. (Change into Active)

Register Number :

Name of the Candidate :

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**B.E. DEGREE EXAMINATION, 2015**

(FIRST SEMESTER)

**102. ENGINEERING MATHEMATICS - I**

(Common to ALL Branches)

November ]

[ Time : 3 Hours

Maximum : 75 Marks

Answer any FIVE questions choosing,  
ONE FULL question from each unit.

**UNIT - I**

1. (a) Find the eigen values and eigen vectors of  $A = \begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$ . (8)

(b) Using Cayley Hamiton theorem, find  $A^{-1}$  if  $A = \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$ . (7)

2. Diagonalise the matrix  $\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{pmatrix}$  and find  $A^3$ . (15)

**UNIT - II**

3. (a) Find the equation of the circle of curvature of  $\sqrt{x} + \sqrt{y} = 1$  at  $\left(\frac{1}{4}, \frac{1}{4}\right)$ . (7)

(b) Find the envelope of  $\frac{x}{a} + \frac{y}{b} = 1$ , where  $a$  and  $b$  are connected by  $a^2 + b^2 = c^2$ ,  
 $c$  being constant. (8)

4. Find the evolute of the curve  $x^{2/3} + y^{2/3} = a^{2/3}$ . (15)

## UNIT - III

5. (a) If  $u = 2xy$ ,  $v = x^2 - y^2$  and  $x = \gamma \cos \theta$ ,  $y = \gamma \sin \theta$ , evaluate  $\frac{\partial (u, v)}{\partial (\gamma, \theta)}$ , without actual substitutions. (7)
- (b) Expand  $e^x \cos y$  about  $(0, \frac{\pi}{2})$  upto third term using Taylor's series. (8)
6. (a) Find the maximum and minimum values of  $f(x, y) = x^3 y^2 (1 - x - y)$ . (7)
- (b) Find the maximum value of the largest rectangular parallel piped that can be inscribed in an ellipsoid  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ . (8)

## UNIT - IV

7. (a) Evaluate :  $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dy dx}{1+x^2+y^2}$ . (7)
- (b) Change the order of integration and evaluate  $\int_0^{4a} \int_{4a}^{2\sqrt{ax}} xy dy dx$ . (8)
8. (a) Find the volume of the portion of the ellipsoid  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ , which lies in the first octant. (7)
- (b) Find the area of the cardioid  $\gamma = a(1 + \cos \theta)$ . (8)

## UNIT - V

9. (a) Find :  $L \left[ \frac{\cos at - \cos bt}{t} \right]$ . (7)
- (b) Find :  $L^{-1} \left[ \log \left( \frac{s^2 - a^2}{s^2 - b^2} \right) \right]$ . (8)
10. Solve  $(D^2 + 4D + 8)y = 1$ , given  $y(0) = 0$ ,  $y'(0) = 1$  using Laplace transform. (15)

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**B.E. DEGREE EXAMINATION, 2015**

( COMMON TO ALL BRANCHES )

( ANNUAL PATTERN )

( FIRST YEAR )

**CLEC-102. ENGINEERING MATHEMATICS - I**

( For the candidates of 2011-12 batch and later )

November ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.*

*ALL questions carry EQUAL marks.*

**UNIT - I**

1. (a) Diagonalise the matrix  $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$  by means of an orthogonal reduction. (7)

(b) Find the Evolute of the curve  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ . (8)

(OR)

2. (a) Verify the Cayley Hamilton theorem for  $A = \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$  and hence, find its inverse. (8)

(b) Find the radius of curvature of the curve  $y = c \cos h \frac{x}{c}$  at point (0, c). (7)

**UNIT - II**

3. (a) Solve :  $(D^2 - 2D + 1)y = x^2 e^{3x}$ . (7)

(b) In case of stability of rods, the equation satisfied by the deflection is

$$EI \frac{d^2 y}{dx^2} + Py = C - Rx \quad \text{where } E, I, C, P, R \text{ are constants. If } y = 0 \text{ and } \frac{dy}{dx} = 0 \text{ when } x = 0 \text{ and } x = l. \text{ S.T. } \tan(nl) = nl \text{ where } Eln^2 = P \text{ and } C = RI. \quad (8)$$

(OR)

4. (a) Solve :  $x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = \sin(\log x).$  (8)

(b) Solve :  $\frac{d^2 y}{dx^2} + 4y = 4 \tan 2x$  using method of variation of parameters. (7)

### UNIT - III

5. (a) Change the order of integration and hence, evaluate  $\int_0^3 \int_1^{\sqrt{4-y}} (x+y) dx dy.$  (8)

(b) If  $\nabla^2 \phi = 0$ , show that  $\nabla \phi$  is both solenoidal and irrotational. (7)

(OR)

6. (a) Evaluate :  $\iint_R (x^2 + y^2) dx dy$  where R is the region in the positive quadrant for which  $x + y \leq 1.$  (7)

(b) Using Green's theorem to evaluate  $\int_C [(2x - y) dx + (x + y) dy]$  where C is the boundary of the circle  $x^2 + y^2 = a^2$  in the XOY -plane. (8)

### UNIT - IV

7. (a) If  $f(z)$  is regular function of  $z$ , prove that  $\left( \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4 |f'(z)|^2.$  (8)

(b) Expand  $f(z) = \frac{z^2 - 1}{(z+2)(z+3)}$  in Laurent's series if

(i)  $|z| > 3.$  (ii)  $2 < |z| < 3.$  (7)

(OR)



8. (a) Find the image of  $|z + 1| = 1$  under the mapping  $w = \frac{1}{z}$ . (6)

(b) Evaluate :  $\int_0^{\infty} \frac{\cos ax}{x^2 + 1} dx$  using counter integration. (9)

UNIT - V

9. (a) Find :  $L \left[ \frac{\cos 2t - \cos 3t}{t} \right]$ . (5)

(b) Find :  $L \left[ \int_0^t t e^{-t} \sin t dt \right]$ . (5)

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

(OR)

10. (a) Solve :  $y'' - 3y' + 2y = e^{2t}$ ,  $y(0) = -3$ ,  $y'(0) = 5$ . (8)

(b) Find :  $L^{-1} \left[ \log_e \left( 1 + \frac{\omega^2}{s^2} \right) \right]$ . (7)

**B.E. DEGREE EXAMINATION, 2015**

(FIRST YEAR)

**103. ENGINEERING PHYSICS***( Common To ALL BRANCHES )**( For the candidates of 2014-15 batch )*

November ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer ONE FULL question from each unit.**ALL questions carry EQUAL Marks.***UNIT - I**

1. (a) State Hook's law and give the relation between E, K, N and  $\gamma$ . (8)
  - (b) Distinguish between streamline and turbulent flow. (7)
- (OR)
2. (a) Derive an expression for Sabine's formula. (8)
  - (b) Describe the construction and working of Piezo-electric oscillator. (7)

**UNIT - II**

3. (a) Describe the construction and working of Nd : YAG laser. (8)
  - (b) Derive an expression for Numerical aperature and acceptance angle. (7)
- (OR)
4. (a) Describe the construction and working of Michelson's interferometer. (8)
  - (b) State the stress-optic law and obtain an expression for the same. (7)

**UNIT - III**

5. (a) What is packing factor? Prove that the packing of faction of HCP is 0.74. (8)
  - (b) What are Miller Indices? Explain how they are determined. (7)
- (OR)
6. (a) Derive an expression for packing factor of SCC, BCC and FCC. (8)
  - (b) Distinguish between Schottky defect and Frenkel defect. (7)

**UNIT - IV**

7. (a) Describe the fabrication and application of metallic glasses. (8)
  - (b) What is internal fields and derive an expression for Classius - Mosstti relation. (7)
- (OR)
8. (a) Derive an expression for carrier concentration for electron in an intrinsic semiconductor. (8)
  - (b) What is Meissner effect ? Explain Type-I and Type-II super conductor. (7)

**UNIT - V**

9. (a) Derive an expression for Schrodinger time independent and dependent equation. (8)
  - (b) Explain the construction and working of Davisson and Germer experiment. (7)
- (OR)
10. (a) Explain the construction and working of G.M. counter. (8)
  - (b) Explain intersteller energy process. (7)

**B.E. DEGREE EXAMINATION, 2015**

(FIRST SEMESTER)

**104. ENGINEERING CHEMISTRY - I***( Common to ALL Branches )*

November ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.**ALL questions carry EQUAL marks.***UNIT - I**

1. (a) Explain phosphate and carbonate methods of internal treatment of boiler feed water. (7)
  - (b) How is the softening of water carried out using the zeolite process? (8)
- (OR)
2. (a) Describe the method involved in removal of dissolved O<sub>2</sub> and CO<sub>2</sub> in water. (6)
  - (b) What is desalination? Explain one method of desalination in detail. (9)

**UNIT - II**

3. a) Describe the method for the determination of EMF of a electrochemical cell. (6)
  - (b) (i) What is reference electrode? (3)
  - (ii) Explain the working principle of standard hydrogen electrode. (6)
- (OR)
4. (a) Explain the working principle of glass electrode. (6)
  - (b) What is electrochemical series? Give its application. (9)

**UNIT - III**

5. (a) What is synthetic petrol? How is it manufactured by Fisher-Tropsch method? (8)
  - (b) How is metallurgical coke manufactured by Otto-Hoffmann oven? (7)
- (OR)
6. (a) Explain the octane number and cetane number. (8)
  - (b) Describe the determination of flue gas analysis. (7)

**UNIT - IV**

7. (a) Explain the classification of lubricants with example. (8)
  - (b) Explain the properties of lubricants. (7)
- (OR)
8. (a) What are emulsions? Mention their applications. (7)
  - (b) How chemical and physical factors influence adhesive action? (8)

**UNIT - V**

9. (a) Explain partition chromatography with examples. (7)
  - (b) What are the applications of adsorptions? (8)
- (OR)
10. (a) Discuss Freundlich adsorption isotherm. Write its limitation. (8)
  - (b) Explain the types of adsorption. (7)

**B.E. DEGREE EXAMINATION, 2015**

(ANNUAL PATTERN )

( FIRST YEAR )

**104. ENGINEERING CHEMISTRY***( Common To ALL Branches )**( For the candidates of 2011-12 to 2015 batch only)*

November ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.**ALL questions carry EQUAL marks.***UNIT - I**

1. (a) Explain the demineralization of water by Ion-exchange process. How are exhausted cation and anion exchange resins regenerated? (8)
  - (b) Distinguish between COD and BOD. (7)
- (OR)
2. (a) How do you determine the hardness of water by EDTA method? (8)
  - (b) Give an account of acid rain and photochemical smog. (7)

**UNIT - II**

3. (a) Explain the following with examples : (7)
    - (i) Condensation polymerisation. (ii) Copolymerisation. (8)
  - (b) Discuss Freundlich adsorption isotherm. Write its limitations. (8)
- (OR)
4. (a) Explain the factors influencing of adsorption of gases on solids. (8)
  - (b) Write the preparation, properties and uses of : (7)
    - (i) Polyester resins. (ii) Silicone resins. (8)

**UNIT - III**

5. (a) What is crude petroleum? What are the products obtained from petroleum? (7)
  - (b) Explain the octane and centane number. Write briefly about synthetic petrol. (8)
- (OR)
6. (a) Explain the working of photovoltaic cells. (7)
  - (b) Describe the determination of flue gas analysis. (8)

**UNIT - IV**

7. (a) What is electrochemical series? Give its application. (8)
  - (b) Describe the construction of lead-acid battery with the reaction occurring during discharge. (7)
- (OR)

8. (a) What is cathodic protection? Explain sacrificial anode method. (8)
- (b) Give an account of phosphating and galvanization metal coating. (7)

**UNIT - V**

9. (a) How are refractories classified? Give an example for each class. (7)
  - (b) Explain chemical vapour deposition technique of synthesis of nano particles. (8)
- (OR)
10. (a) Write a note on solid lubricants. (7)
  - (b) Describe the preparation of any two methods of carbon nanotubes. (8)

**B.E. DEGREE EXAMINATION, 2015**

( COMMON TO ALL BRANCHES )

( FIRST YEAR )

**105. ENGINEERING MECHANICS***( For the candidates of 2011-12 batch and later )*

November ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.**ALL questions carry EQUAL marks.***UNIT - I**

1. (a) Explain concurrent forces and coplanar forces. (5)
- (b) The force system shown in figure-1 has a resultant of 900 N pointing up along the  $y$ -axis. Find the value of  $F$  and  $\theta$  required to give this resultant. (10)

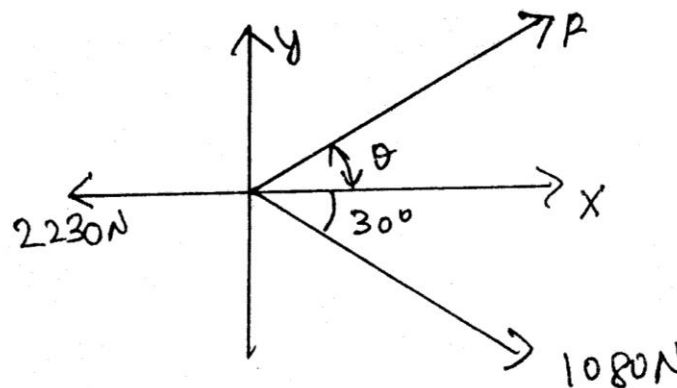


Figure-1

(OR)

2. (a) Explain the following :
- (i) Free body diagram. (ii) Types of equilibrium. (iii) Equivalent forces. (10)

- (b) Two forces  $F_1 = 20 \text{ kN}$  and  $F_2 = 15 \text{ kN}$  acts on a particle as shown in figure-2. Find the resultant by parallelogram law and triangular law. (5)

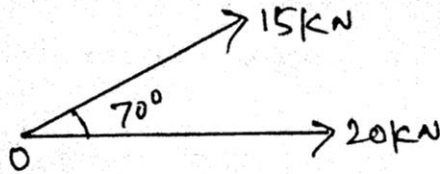


Figure-2

## UNIT - II

3. The bar AB shown in figure-3 is attached to a rope BC. Determine the reactions in A and the tension in the rope.

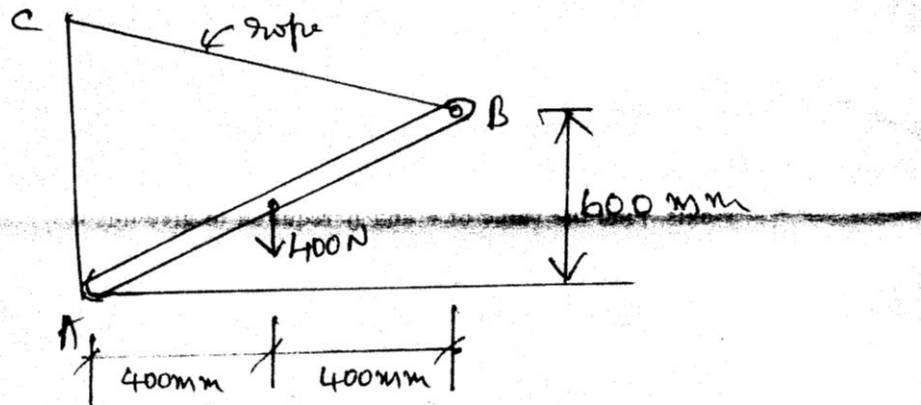


Figure-3

(OR)

4. Find the reactions at support A and B for the beam shown in the figure-4.

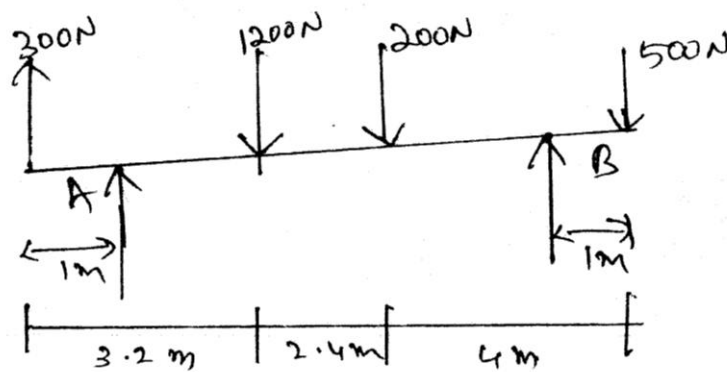


Figure-4

## UNIT - IV

5. Find the centroid of the plane area as shown in figure-5.

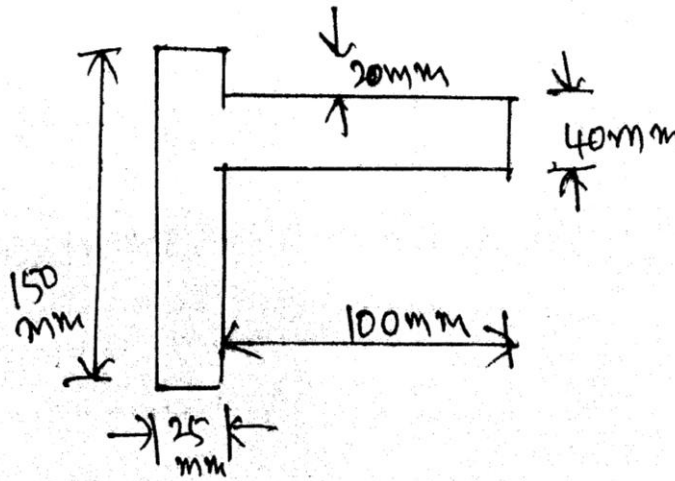


Figure-5

(OR)

6. Determine the mass moment of inertia of a rectangular plate size  $a \times b$  and thickness  $t$  about the centroidal axes.

## UNIT - IV

7. A steel bar is 900 mm long. Its two ends are 40 mm and 30 mm in diameter and length of each rod is 200 mm. Portion of the bar is 15 mm in diameter and 500 mm long. If the bar is subjected to an axial load of 15 kN, find its total extension.

(OR)

8. The following data refers to a bar subjected to a tensile test :

Diameter of the bar = 30 mm.      Tensile load = 54 kN.

Gauge length = 300 mm.      Extension of the bar = 0.112 mm.

Change in diameter = 0.00366.

Calculate the Poissons ratio and values of three modulii.

## UNIT - V

9. A load of 20 kN is to be lifted by a differential wheel and axle. It consists of differential axle of 250 mm and 300 mm diameter and the wheel diameter is 800 mm. Find the effort required if the efficiency of the machine is 55%.

(OR)

10. An open belt drive connects two pulleys 120 cm and 50 cm diameters, on parallel shafts 4 m apart. The maximum tension in the belt is 1855.3 N. The co-efficient of friction is 0.3. The driver pulley of diameter 120 cm runs at speed of 200 rpm. Calculate :

(a) The power transmitted and (b) Torque on each of the shafts.

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**B.E. DEGREE EXAMINATION, 2015**

( COMMON TO ALL BRANCHES )

( ANNUAL PATTERN )

( FIRST YEAR )

**CLEC-107. ENVIRONMENTAL STUDIES**

November ]

[ Time : 3 Hours

Maximum : 75 Marks

*Answer any ONE FULL question from each unit.*

*ALL questions carry EQUAL marks.*

**UNIT - I**

1. (a) What is deforestation? Explain its impact on the environment. (8)
- (b) Define the term conservation of natural resources and explain the role of an individual in conservation of natural resources. (8)

(OR)

2. (a) Explain in detail about changes caused by modern agricultural and overgrazing. (8)
- (b) Discuss briefly about the various environmental effect of extracting and using mineral resources. (7)

**UNIT - II**

3. (a) What are the different types of ecosystems and explain the structure and function of forest ecosystem. (10)
- (b) Explain about ecological pyramids. (5)

(OR)

4. Describe the types, characteristic features, structure and function of desert and aquatic ecosystem. (15)

**UNIT - III**

5. (a) Explain *in-situ* and *ex-situ* conservation of biodiversity. (8)
- (b) Classify the values of biodiversity in detail. (7)

(OR)

6. (a) What are the various hot spots of biodiversity in India? (4)
- (b) Discuss briefly about the endangered and endemic species of India. (11)



#### UNIT - IV

7. (a) Explain the various sources, effects and methods of control of water pollution. (10)  
(b) How is thermal pollution controlled? Explain. (5)

(OR)

8. (a) Explain the sources and different classification of municipal solid waste. (8)  
(b) Discuss the causes and control measures of  
(i) Marine pollution. (ii) Water pollution. (3 + 4)

#### UNIT - V

9. (a) Explain the term sustainable development and their concepts. (5)  
(b) Discuss the salient features of Forest Conservation Act. (10)

(OR)

10. (a) What is the need for rain-water harvesting? What are the ways of achieving it? (7)  
(b) Discuss briefly the role of information technology in environmental and human health.(8)