

AR16

CODE: 16CE1001

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I B.Tech I Semester Regular Examinations, December, 2016

**Building Materials and Construction
(Civil Engineering)**

Time: 3 Hours

Max Marks: 70M

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered at one place

UNIT-I

- | | | | |
|-------------|---|---|----|
| 1. | a | Explain the manufacturing of brick and harmful ingredients of brick earth | 8M |
| | b | Discuss briefly the classification of rocks | 6M |
| (OR) | | | |
| 2. | a | Discuss about the seasoning of timber and characteristics of good timber | 8M |
| | b | Explain the manufacturing, characteristics and uses of ceramic products | 6M |

UNIT-II

- | | | | |
|-------------|---|---|----|
| 3. | a | Discuss briefly about the fresh and hardened concrete | 8M |
| | b | What are the alternative materials for the Fiber reinforced plastics and discuss their importance in connection with the building construction? | 6M |
| (OR) | | | |
| 4. | a | Explain about production of concrete | 8M |
| | b | Explain the specific uses of metals and Glass materials | 6M |

UNIT-III

- | | | | |
|-------------|---|--|----|
| 5. | a | Explain about different types of foundations | 8M |
| | b | Discuss about the stepped footing with a neat sketch | 6M |
| (OR) | | | |
| 6. | a | Explain about types of partitions walls and load bearing walls | 8M |
| | b | What are the general principles and uses of stone masonry | 6M |

UNIT-IV

- | | | | |
|-------------|--------------------------------|---|----|
| 7. | a | Explain about different types of doors and roofs | 8M |
| | b | Explain about prefabricated elements and its uses | 6M |
| (OR) | | | |
| 8. | Explain about types of stairs? | | |
| | (a) | Dog-legged stair | 6M |
| | (b) | Open newel stair. | 4M |
| | (c) | Geometrical stair. | 4M |

UNIT-V

- | | | | |
|-------------|---|--|----|
| 9. | a | Explain the processes of Plastering, Pointing and Distempering | 8M |
| | b | Discuss the Qualities expected of a good paint? | 6M |
| (OR) | | | |
| 10. | a | Explain about the composition of ideal paint | 8M |
| | b | Write short notes on Formwork and Scaffolding | 6M |

AR16

CODE: 16ME1002

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I B.Tech I Semester Regular Examinations, December, 2016

ENGINEERING MECHANICS

(For EEE, ECE Branches)

Time: 3 Hours

Max Marks: 70M

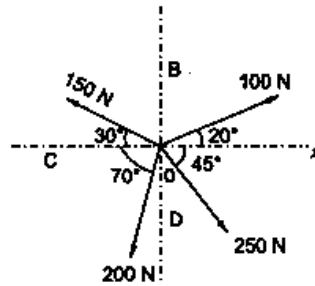
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered at one place

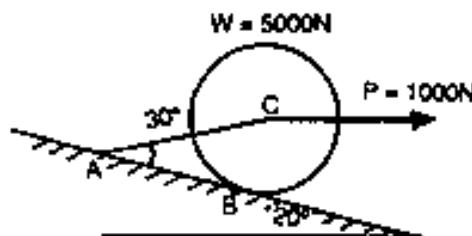
UNIT-I

1. **a** Differentiate between resultant and equilibrant
- b** Determine the resultant of the coplanar concurrent force system shown in Fig.



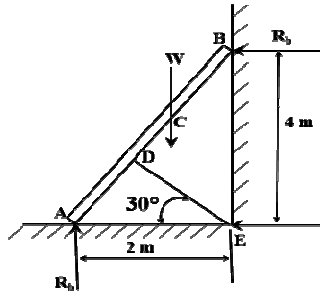
(OR)

2. **a** Explain polygon law. Define equilibrium.
- b** A right circular roller of weight 5000N rests on a smooth inclined plane and is held in position by a chord AC as shown in fig. Find the tension in the chord and reaction at B, if there is a horizontal force $P=1000\text{N}$ acting at C.



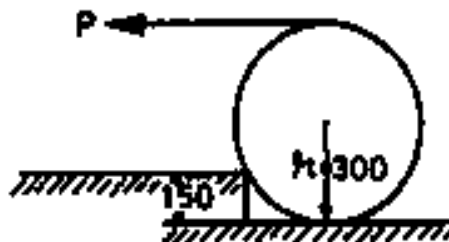
UNIT-II

3. A 750 N man stands on the middle rung of a 300 N ladder, as shown in the figure. Assuming that the floor and wall are perfectly smooth and that slipping is prevented by string DE, find the tension S in the string and also the reactions R_a and R_b at A and B.



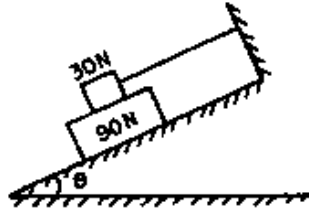
(OR)

4. A roller of radius $r = 300$ mm and weight 2000 N is to be pulled over a curb of height 150 mm by a horizontal force P applied to the end of a string wound tightly around the circumference of the roller. Find the magnitude of P required to start the roller move over the curb. What is the least pull P through the centre of the wheel to just turn the roller over the curb as shown in Fig.



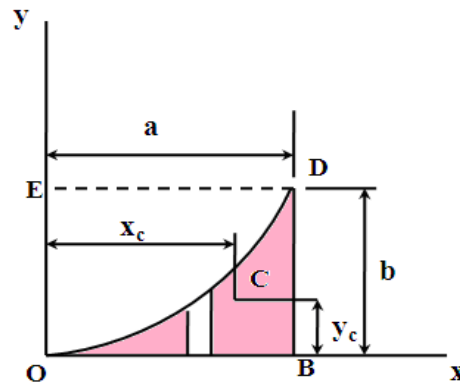
UNIT-III

5. What should be the value of the angle θ in Fig. so that the motion of the 90 N block impends down the plane? The coefficient of friction μ for all the surfaces is $1/3$.



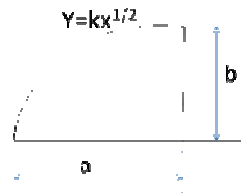
(OR)

6. Determine the coordinates x_c and y_c of the centroid C of the area of the spandrel OBD if the curve OD is a portion of a parabola $x^2 = 4ky$ with vertical axes OY as shown in Figure.



UNIT-IV

7. Determine the moment of inertia of the shaded area of the curve $y=kx^{1/2}$ about the x and y-axis as shown in Fig.

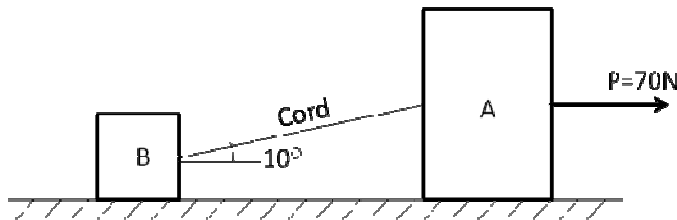


(OR)

8. Determine second moment of mass about its axis of a right circular solid cone having base b and height h .

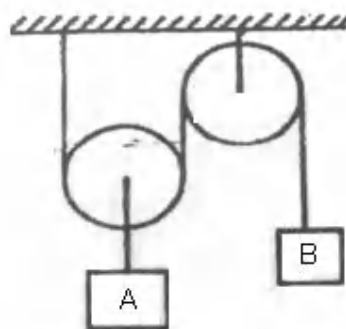
UNIT-V

9. A horizontal force $P = 70 \text{ N}$ is applied on mass $A = 16 \text{ kg}$ as shown in figure. The coefficient of friction between A and the horizontal plane is 0.25 . B has a mass of 4 kg and coefficient of friction between it and the plane is 0.50 . The cord between the A and B makes an angle of 10° with the horizontal. What is the tension in the cord? find acceleration of the system.



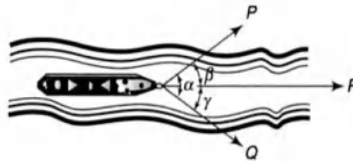
(OR)

10. **a** A small steel ball is shot vertically upwards from the top of a building 25 m above the ground with an initial velocity of 18 m/sec . (i) In what time, it will reach the maximum height (ii) How high above the building will the ball rise (iii) Compute the velocity with which it will strike the ground and the total time it is in motion.
- b** Two weights A and B are connected through pulleys as shown in the Fig. Neglecting friction and inertia of the pulleys and the rope, find the acceleration of the weight B if $A = 100 \text{ N}$ and $B = 75 \text{ N}$.

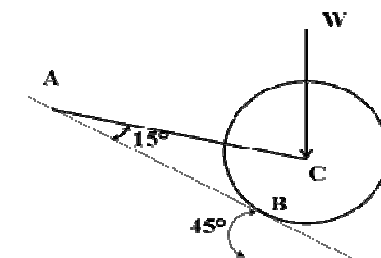


UNIT-I

1. **a** State and explain parallelogram law of forces with a neat sketch. **4M**
- b** A boat is moved uniformly along a canal by two horses pulling with forces $P=890\text{N}$ and $Q=1068\text{N}$ acting under an angle $\alpha = 60^\circ$ (see below Figure). Determine the magnitude of the resultant pull on the boat and the angles β and γ as shown in the figure. **10M**

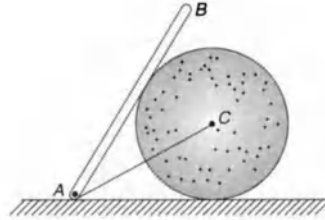
**(OR)**

2. **a** Explain free body diagram with examples. **4M**
- b** A roller of weight $W=4450\text{ N}$ rests on a smooth inclined plane and is kept from rolling down by a string as shown in the figure. Find the tension S in the string and the reaction R_b at the point of contact B. **10M**



UNIT-II

3. a State and explain Varignon's theorem. **4M**
- b A smooth right circular cylinder of radius r rests on a horizontal plane and is kept from rolling by an inclined string AC of length $2r$ (Fig.). A prismatic bar AB of length $3r$ and weight Q is hinged at point A and leans against the roller as shown. Find the tension S that will be induced in the string AC. **10M**

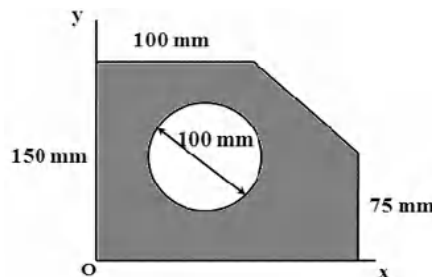


(OR)

4. a Explain the concept of limiting friction **5M**
- b Explain the following. **9M**
- i) Laws of dry friction
 - ii) Angle of friction
 - iii) Angle of repose

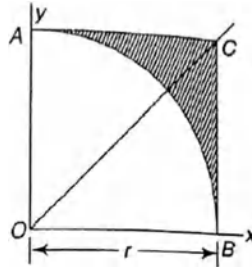
UNIT-III

5. a Explain pappus theorems. **4M**
- b Referring to the Figure, determine the coordinates x_c and y_c of the center of a 100mm diameter, circular hole cut in a thin plate so that this point will be the centroid of the remaining shaded area. **10M**



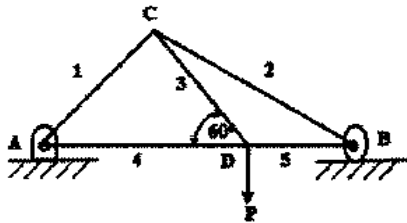
(OR)

6. a Explain parallel axes theorem. 4M
b Calculate the Moment of Inertia of shaded portion 10M
about X – axis.



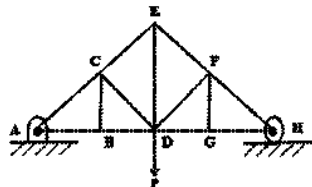
UNIT-IV

7. a Explain Zero force members with suitable figures. 4M
b Calculate the axial force S_i in each bar of the simple 10M
truss supported and loaded as shown in the figure.
The triangle ACB is isosceles with 30° angles at A and B and $P = 10 \text{ KN}$

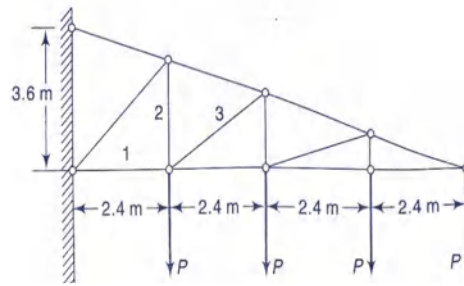


(OR)

8. a Prove that a tensile force equal to the applied load P is 4M
produced in the bar DE of the truss shown in the
figure



- b Using method of sections, calculate the axial force in 10M
bars 1,2 and 3 of the plane cantilever truss loaded as
shown in fig.



UNIT-V

9. a State and explain the principle of virtual work. 4M
 b Determine the reaction produces at D using principle of virtual work for the problem shown in figure 9 10M

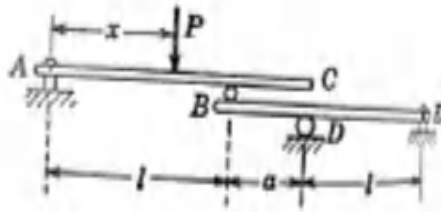


Fig9

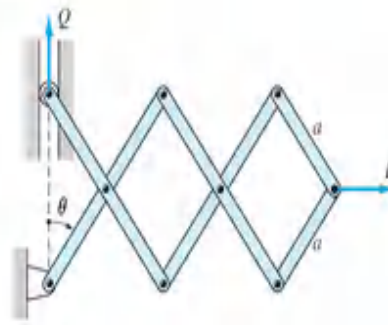


Fig10.

(OR)

10. a List the forces and the effects which do not yield non-zero work. 4M
 b Determine the ratio P/Q of the forces that are required to maintain equilibrium of the mechanism for an arbitrary angle θ as shown in figure10. Neglect the weight of the mechanism. 10M

4 of 4

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered at one place

UNIT-I

1. a) State Kirchhoff's current and voltage laws. Explain with suitable examples. 7M
b) Derive the expressions for converting a Delta network to a Star network. 7M

(OR)

2. a) Derive the expression for series and parallel RLC circuit to determine voltage drop across each element. 6M
b) What are the properties and functions of resistor, Inductor and capacitor. 8M

UNIT-II

3. a) Explain the principle and operation of D.C. motor with neat diagram. 7M
b) Classify the D.C. generators. 7M

(OR)

4. a) What is necessity of 3-point starter ? and Derive the Torque equations of D.C Motor. 8M
b) A 4-pole motor is fed at 440v and takes an armature current of 50A. The resistance of the armature circuit is 0.28 ohms. The armature is wave-wound with 888 conductors and the useful flux per pole is 0.023Wb. Calculate the speed. 6M

UNIT-III

5. a) Draw the equivalent circuit diagram of 1-phase transformer and explain about O.C. and S.C. tests. 8M
b) Derive an E.M.F. equations of single phase transformer. 6M

(OR)

6. a) Draw and explain the torque – slip characteristics of three phase induction motor. 7M
b) Explain the principle of operation of three phase induction motor and determine the synchronous speed and slip of a 6pole, 3-phase, 50Hz induction motor. 7M

UNIT-IV

7. a) Explain the principle operation of permanent magnet moving coil instrument with neat diagram. 7M
b) Explain the principle operation of attraction type moving iron instrument with neat diagram. 7M

(OR)

8. a) Derive an E.M.F. equations of alternator. 7M
b) Explain the procedure to find the regulation of alternator by synchronous impedance method. 7M

UNIT-V

9. a) Explain the working of transistor and draw the symbols of P-N-P and N-P-N transistor. 8M
b) Explain the working and operation of half wave rectifier and draw the output wave forms. 6M

(OR)

10. a) V-I characteristics of P-N junction diode and its applications. 6M
b) A half wave rectifier has a load of 3.5 k Ω . If the diode resistance and secondary coil resistance together has a resistance of 800 Ω . The input voltage has a single voltage of peak value 240V. 8M
Calculate i) Peak, average and rms value of current flowing ii) D.C. power output
iii) A.C. power input and iv) efficiency of the rectifier.