AR16

CODE: 16CE1001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, February-2020

BUILDING MATERIALS AND CONSTRUCTION

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

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 methods for preservation of timber	6M
	b)	Explain the process of burning bricks in clamps with a neat sketch.	8M
		(OR)	
2.	a)	Distinguish between fat lime and hydraulic lime	6M
	b)	Explain about any four types of cements.	8M

UNIT-II

3.	a)	Write a note on Fiber reinforced plastics.	6M
	b)	Discuss the various factors affecting the workability of concrete.	8M
		(OR)	
4.	a)	Explain the manufacturing process of glass.	7M
	b)	Write a note on classification of plastics.	7M

UNIT-III

5.	a)	What are the various damp proofing materials?	7M
	b)	Give the classification of stone masonry.	7M
		(OR)	
6.	a)	Explain the different types of bonds in brick work.	8M
	b)	Distinguish between shallow foundations and deep foundations.	6M

UNIT-IV

7.	a)	Explain different types of stairs with neat sketch.	8M
	b)	What are the essential requirements of a good roof?	6M
		(OR)	
8.	a)	Write a note on standard sizes of doors and windows used commonly in buildings.	7M
	b)	Explain the guidelines to be followed while planning a stair case for a residential building.	7M

UNIT-V

9.	a)	Explain the types of paints according to the uses.	8M
	b)	Write a short note on cement plaster.	6M
		(OR)	
10.	a)	What is under pinning? Explain different methods of underpinning.	8M
	b)	What are the types of varnishes?	6M

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AR16

CODE: 16ME1002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, February-2020

ENGINEERING MECHANICS

(For EEE, ECE Branches)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

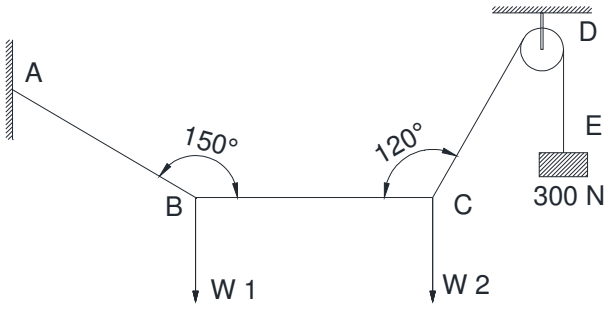
1. The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting at one of the angular points of a rectangular hexagon towards the other five angular points, taken in order. Find the magnitude and direction of the resultant force. [14 M]

(OR)

2. The following forces act at a point. [14 M]
   (i)20 N inclined at 30^0 towards North of East.
   (ii) 25 N towards North. iii) 30 N towards North West.
   iv)35 N inclined at 40^0 towards South of West.
   Find the magnitude and direction of the resultant force.

UNIT-II

3. A light string ABCDE whose extremity A is fixed, has weights W_1 and W_2 attached to it at B and C. It passes round a small smooth peg at D carrying a weight of 300 N at the free end E as shown in figure. If in the equilibrium position, BC is horizontal and AB and CD make 150^0 and 120^0 with BC, find (i) tensions in the portion AB, BC and CD of the string and (ii) magnitudes of W_1 and W_2. [14 M]



(OR)

4. Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in Figure2. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C. [14 M]

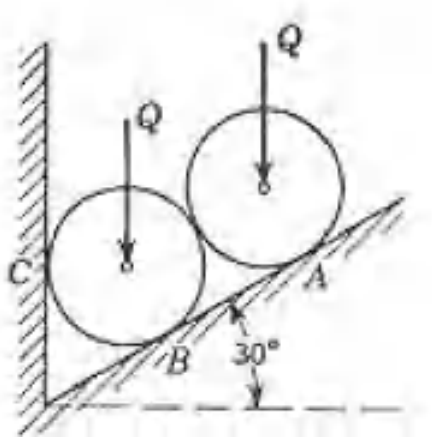


Figure-2

UNIT-III

5. Block A weighing 1000 N is to be raised by means of a 15^0 wedge B weighing 500 N. Assuming the coefficient of friction between all contact surfaces to be 0.2, determine what minimum horizontal force P should to raise the block. [14 M]

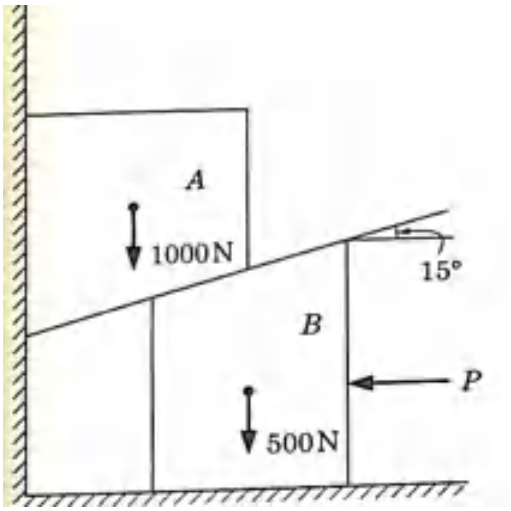
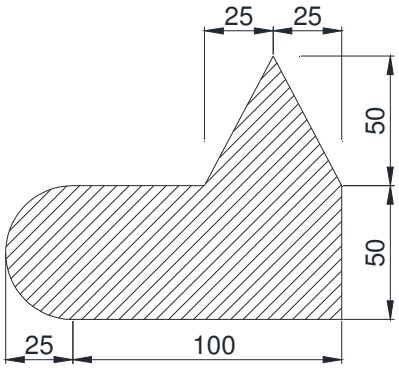


Figure-3

(OR)

6. a) State the Pappu's theorems [4 M]
   b) A uniform lamina shown in figure consists of a rectangle, a semicircle and a triangle. Determine the centroid of the lamina. All dimensions are in mm. [10 M]

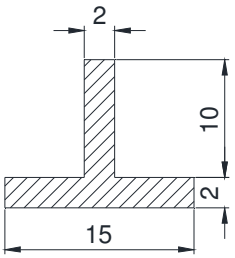


UNIT-IV

7. a State and prove parallel axis theorem [4M]
   b Derive the expression for moment of inertia of a semi circle about its base. [10 M]

(OR)

8. An inverted T-section is shown in figure. Calculate the M.I of the section about X-X axis parallel to the base and passing through the centroid. Also calculate the radius of gyration. [14 M]

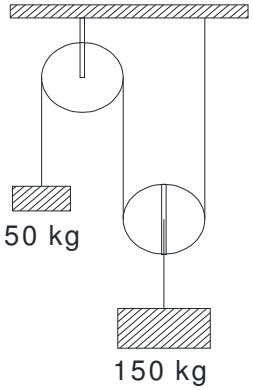


UNIT-V

9. A particle moves along a straight line and its motion is represented by the equation $s = 16t + 4t^2 - t^3$ where 's' is in metres and 't' in seconds. [14 M]
   Determine (a) displacement, velocity and acceleration 2 seconds after start
   (b) displacement and acceleration when velocity is zero
   (c) displacement and velocity when acceleration is zero

(OR)

10. Determine the tension in the strings and acceleration of two blocks of mass 150 kg and 50 kg connected by a string and a frictionless and weightless pulley as shown in figure. [14 M]



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AR16

CODE: 16ME1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, February-2020

ENGINEERING MECHANICS (STATICS)

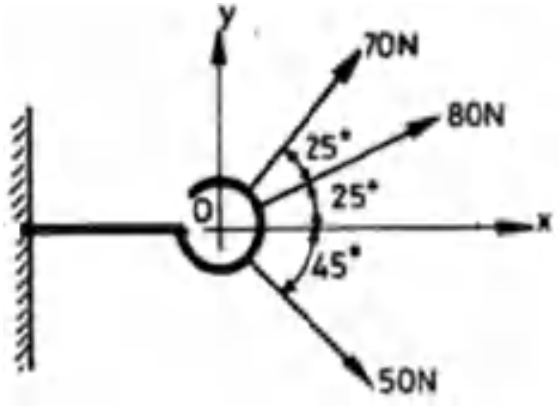
(Mechanical Engineering Branch)

Time: 3 Hours **Max Marks: 70**

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 Determine the magnitude and direction of resultant of the following force system as shown in figures. 7



b Define free body diagram, Transmissibility of a force and resultant of a force. 7

(OR)

2. Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in Figure2. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C. 14

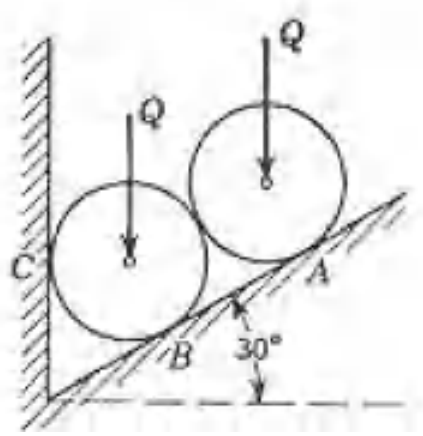


Figure-2

UNIT-II

3. Block A weighing 1000 N is to be raised by means of a 15^0 wedge B weighing 500 N. Assuming the coefficient of friction between all contact surfaces to be 0.2, determine what minimum horizontal force P should to raise the block. 14

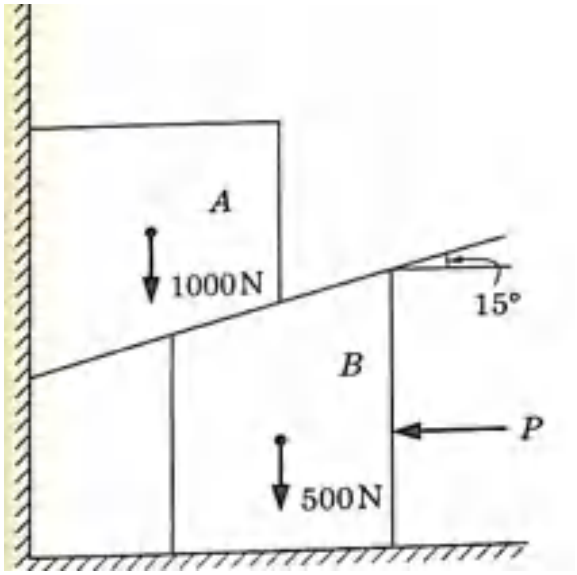
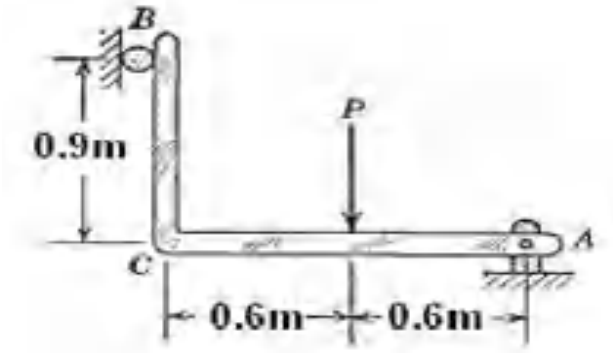


Figure-3

(OR)

4. Explain laws of dry friction 6

Find the reactions R_a and R_b induced at the supports A and B of the right-angle bar ACB supported as shown in Figure and subjected to a vertical load P applied at the mid-point of AC. 8



UNIT-III

5. a From the first principle find the centroid of a right angle triangle of height h and breadth b. 7

   b Derive an expression to determine the moment of inertia of a semi circle about its diametric base. 7

(OR)

6. a Find the centroid of the area shown in figure 6. All dimensions are in cm 7

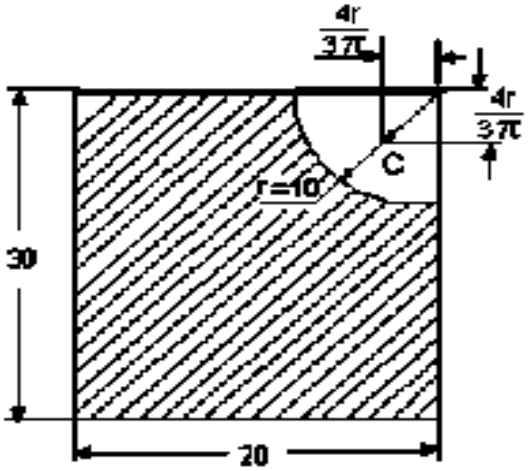


Figure-6

b Compute moment of inertia of hemisphere about its diametral base of radius 'R' 7

UNIT-IV

7. Using the method of joints, find the axial forces induced in all the members of the following truss. 14

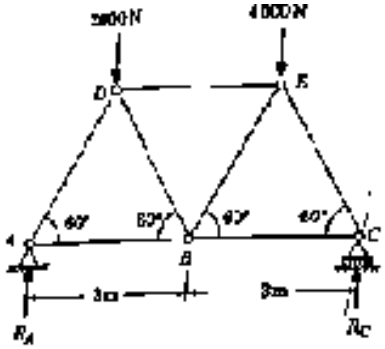


Figure-7

(OR)

8. Find the forces in all the members of the simply-support N-girder as shown in figure 8 by the method of joints. 14

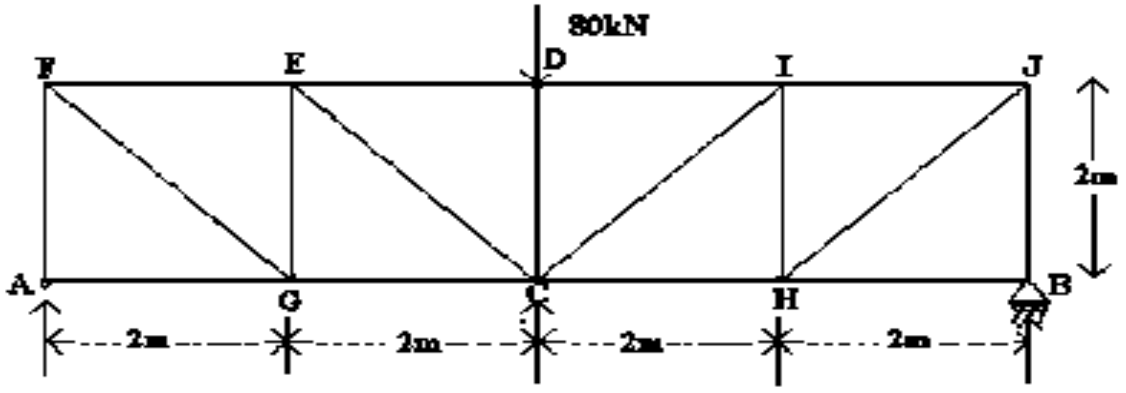


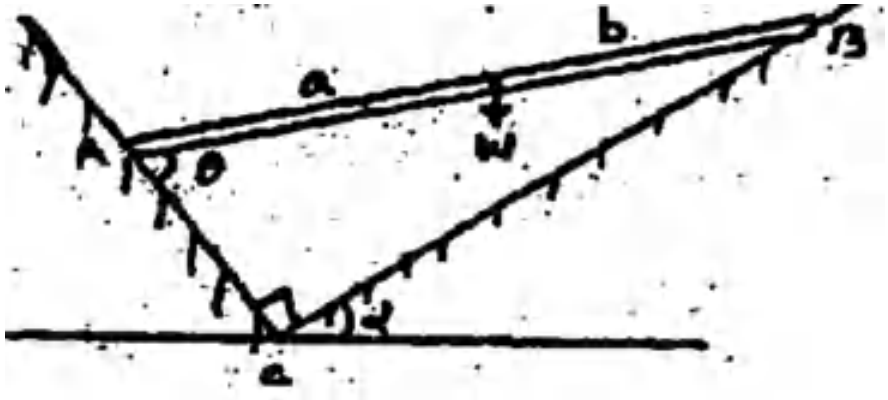
Figure-8

UNIT-V

9.	a	Mention the forces are generally omitted while applying the principle of virtual work	5
	b	Consider a uniaxial bar of length L with constant cross section A and Young's modulus E, fixed at one end and subjected to a force P at the other. Use the principle of virtual work to show that the displacement at the loaded end is $u = PL / EA$.	9

(OR)

10.	a	A rigid bar rests upon three columns, a central column with Young's modulus 100GPa and two equidistant outer columns with Young's moduli 200GPa. The columns are of equal length 1m and cross-sectional area 1 Cm2. The rigid bar is subjected to a downward force of 10kN. Use the principle of virtual work to evaluate the vertical displacement downward of the rigid bar.	7
	b	A bar AB of weight W rests an two mutually perpendicular planes using principle of virtual work find the value Θ for equilibrium. The C.G of the bar is at a distance 'a' and 'b' from ends A and B	7



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AR16

CODE: 16EE1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, February-2020

ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, IT Branches)

Time: 3 Hours **Max Marks: 70**

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 and Explain Kirchhoff's law's. 8M
   b Find the current through all the elements in the circuit as shown in the Figure 1? 6M

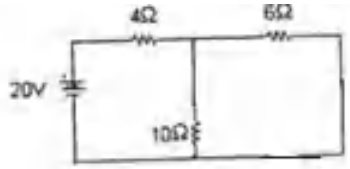

Figure 1

(OR)

2. a A 50Hz, alternating voltage of 150v (r.m.s) is applied independently to (1) Resistance of 10Ω (2) Inductance of 0.2H (3) Capacitance of 50μF. Find the expression for the instantaneous current in each case. Draw the phasor diagram in each case. 7M
   b Explain the star-delta and delta-star transformation for a resistive network? 7M

UNIT-II

3. a Explain the construction of DC machine. 8M
   b Explain principle of operation of DC generator 6M

(OR)

4. a A 4 pole 220V wave connected shunt motor gives 11.19 kW when running at 1000 r.p.m and drawing armature and field current of 50A and 1A respectively. It has 540 conductors. Its resistance is 0.1 ohms. The brush drop is 1V per brush. Calculate total torque, useful torque, flux per pole, rotational losses and efficiency? 7M
   b A 440 V d.c shunt motor takes a no load current of 2.5 A. The resistance of the shunt field and the armature are 550 Ω and 1.2 Ω respectively. The full load line current is 32 A. Find the full load output and the efficiency of the motor. 7M

UNIT-III

5. a A 400/200 V transformer takes 1 A at a power factor of 0.4 on no load. If the secondary supplies a load current of 50 A at 0.8 lagging power factor, calculate the primary current. 7M
   b What are the power losses in single phase transformer? Explain. 7M

(OR)

6. Derive the torque equation of three phase induction motor and also draw the torque – slip characteristics. 14M

UNIT-IV

7.	a	Explain in detail about the constructional features and operation of an alternator?	7M
	b	An alternator runs at 250 r.p.m. and generates an e.m.f. at 50Hz. There are 216 slots each containing 5 conductors. The winding is distributed and full pitch. All the conductors of each phase are in series and flux per pole is 30mWb which is sinusodidally distributed. If the winding is star connected, determine the value of induced e.m.f. available across the terminals.	7M

(OR)

8.		Explain the principle operation of permanent magnet Moving Coil instrument.	14M

UNIT-V

9.	a	Explain the operation of a half wave rectifier with the help of circuit diagram?	7M
	b	Draw the characteristics of P-N junction diode.	7M

(OR)

10.	a	Draw and explain the input and output characteristics for transistor CE configuration?	7M
	b	Discuss about the differences between half wave rectifier and full wave rectifier by using the output waveforms?	7M

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AR13

CODE: 13BS1002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, February-2020

ENGINEERING MATHEMATICS-II
(Common to CIVIL, MECH, CSE, IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) The interval in which the root lies for $f(x) = x\tan x + 1 = 0$ is
   b) Write normal equations to fit a cure $y = mx + c$.
   c) $\delta E^{\frac{1}{2}} =$
   d) Write Simpson's $\frac{3}{8}$ rule for $\int_a^b f(x)dx$.
   e) Write the Taylor's series formula
   f) The 2nd order R-K method formula
   g) Define Heaviside's unit function
   h) $L^{-1}\left\{\frac{1}{s-5}\right\}$
   i) The complete integral of $p^2 - q^2 = 0$ is ?
   j) Write One-dimensional wave equation.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Using Bisection method, find a root of $f(x) = x^3 - x - 2$ correct up to two decimal places. 6M
   b) Using Iteration method, find a real root of the equations $f(x) = \cos x + 1 - 3x = 0$ near to $x = 0$ correct up to 4 decimal places? 6M

(OR)

3. Fit a straight line to the following data and estimate $y(12)$ and $y(28)$ 12M

X	0	5	10	15	20	25
Y	12	15	17	22	24	30

UNIT-II

4. a) Appling Newton's forward interpolation formula, compute the value of $\sqrt{5.5}$, given that $\sqrt{5} = 2.236$, $\sqrt{6} = 2.449$, $\sqrt{7} = 2.646$, $\sqrt{8} = 2.828$ 6M
   b) Using Lagrange's interpolation formula , find the value of $f(3)$ 6M

x	0	1	2	5
y	2	3	12	147

(OR)

5. a) Using Newton's backward interpolation formula, find $\log 58.75$ from the following data — 6M

x	40	45	50	55	60	65
$\log x$	1.60206	1.65321	1.69897	1.74036	1.77815	1.81291

b) Evaluate $\int_0^2 e^{-x^2}\,dx$ using **Simpson's** *1/3* rule by taking $h = 0.25$? — 6M

UNIT-III

6. a) Using Euler's method solve for y at $x - 2$ from $y' - 3x^2 + 1, y(1) - 2$ taking step size $h = 0.25$. — 6M

b) Applying Runge – Kutta fourth order method find $y(0.2)$ and $y(0.4)$ where $y' = -xy^2, y(0) = 2$. Choose step size $h = 0.2$. — 6M

(OR)

7. a) Solve $\frac{dy}{dx} = x + \sqrt{y}, y(0) = 1$ by Euler Modified method to find y at $x = 0.2$ and $x = 0.4$. — 6M

b) Solve $y' = x^2 + y$ with $y(0) = 2$ by Picard method up to fourth degree terms. Compute $y(0.2)$. — 6M

UNIT-IV

8. a) Find the Laplace Transform of $e^{-3t}\sin 5t + \sin 3t$. — 6M

b) Apply convolution theorem to evaluate $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$. — 6M

(OR)

9. a) Find $L\{t\,e^{2t}\sin 3t\}$. — 6M

b) Use Laplace Transform method to solve $\frac{d^2x}{dt^2} - 2\frac{dx}{dt} + x = e^t$ with $x = 2, \frac{dx}{dt} = -1$ at $t = 0$. — 6M

UNIT-V

10. a) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$. — 6M

b) Solve $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} = \cos x \cos 2y$. — 6M

(OR)

11. Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ with boundary conditions $u(x,0) = 3\sin n\pi x,\ u(0,t) = 0$ and $u(1,t) = 0$, where $0 < x < 1, t > 0$. — 12M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, February-2020

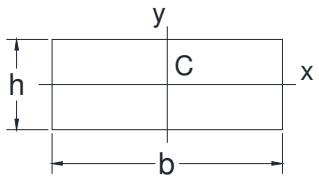
ENGINEERING MECHANICS
(Common to EEE & ECE)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) State parallelogram law of forces.
   b) Define resultant force.
   c) State Varignon's theorem.
   d) Write the conditions of static equilibrium
   e) Define friction.
   f) Define Centroid
   g) State perpendicular axis theorem
   h) Write the expressions for moment of inertia about X-axis and Y-axis.



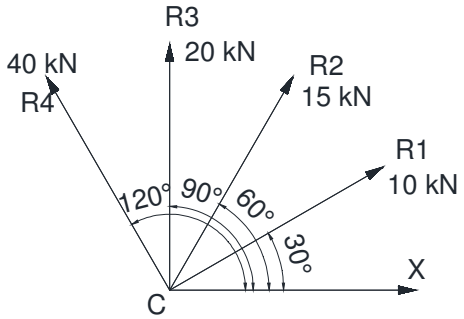
   i) What is uniform motion?
   j) State D'Alemberts principle

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Four forces of magnitude 10 kN, 15 kN, 20 kN and 40 kN are acting at a point C as shown in figure. The angles made by forces 10 kN, 15 kN, 20 kN and 40 kN with X-axis are 30^0, 60^0, 90^0 and 120^0 respectively. Find the magnitude and direction of the resultant force. [12 M]

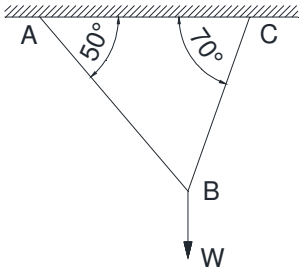


(OR)

3. The following forces act at a point. [12 M]
   (iii) 20 N inclined at 30^0 towards North of East.
   (iv) 25 N towards North. iii) 30 N towards North West.
   v) 35 N inclined at 40^0 towards South of West.
   Find the magnitude and direction of the resultant force.

UNIT-II

4. A small ball of weight W is held by two wires as shown in figure. Estimate the tension induced in the wire AB (i) before the wire BC is cut and (ii) after the wire BC is cut. [12 M]



(OR)

5. Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in Figure2. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C. [12 M]

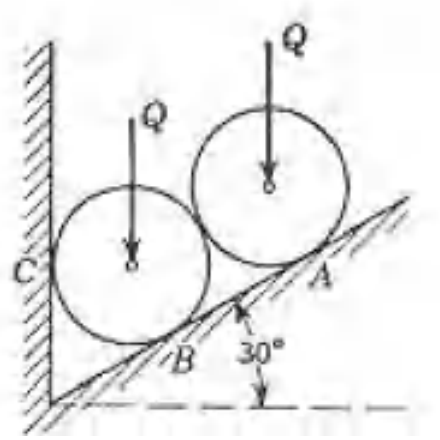


Figure-3

UNIT-III

6. Block A weighing 1000 N is to be raised by means of a 15^0 wedge B weighing 500 N. Assuming the coefficient of friction between all contact surfaces to be 0.2, determine what minimum horizontal force P should to raise the block. [12 M]

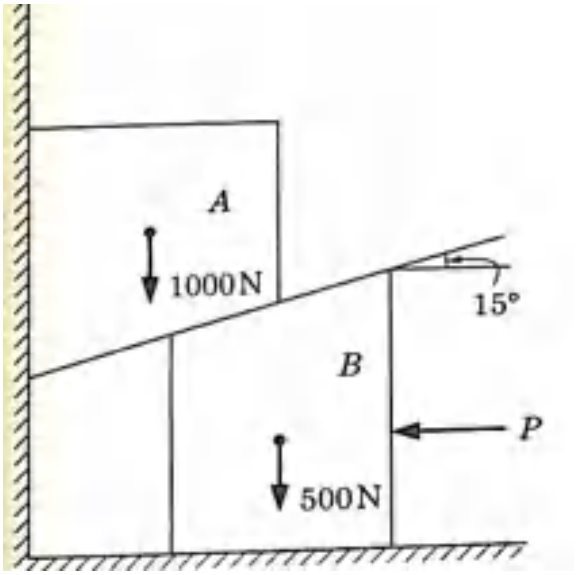
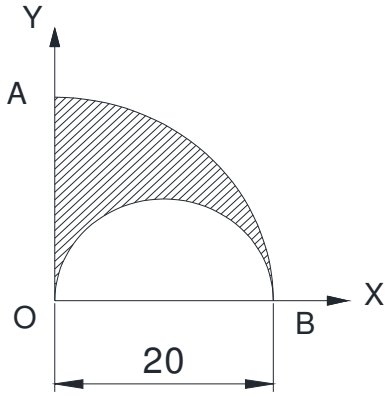


Figure-4

(OR)

7. Find the co-ordinates of the centroid of the area shown in figure. [12 M]

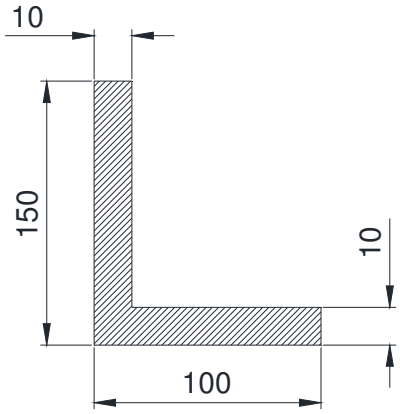


UNIT-IV

8. Derive the expression for moment of inertia of a semi circle about its base. [12 M]

(OR)

9. Find the moment of inertia of the section shown in figure about horizontal and vertical axes through the centroid. [12 M]



UNIT-V

10. A particle moves along a straight line and its motion is represented by the equation $s = 16t + 4t^2 - t^3$ where, 's' is in metres and 't' in seconds. [12 M]
Determine (a) displacement, velocity and acceleration 2 seconds after start
(b) displacement and acceleration when velocity is zero
(c) displacement and velocity when acceleration is zero

(OR)

11. Determine the tension in the strings and accelerations of two bodies of mass 150 kg and 50 kg connected by a string and a frictionless and weightless pulley as shown in figure. [12 M]