

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **ENGINEERING PHYSICS-II**Branch: **COMMON TO EEE,CSE& CE**

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer ALL questions of the following**

5x1Mark=5 Marks

1. What is the condition for constructive interference for mono chromatic light?
2. What is population inversion?
3. Write the Clausius - Mossotti Equation.
4. Define Acceptance angle.
5. Sabine's formula for Reverberation Time.

II. Answer ALL questions of the following

10x2Marks=20 Marks

1. Write the differences between ordinary ray and extraordinary ray.
2. What is the optical path length of a light ray that travelled through a glass plate of 2cm thick.
Refractive index of glass is 1.5?
3. Distinguish between spontaneous and stimulated emissions.
4. Distinguish between LASER and ordinary light.
5. What are Type-II superconductors?
6. Explain magnetic levitation.
7. Distinguish step index and graded index optical fibres.
8. Explain what is quantum confinement.
9. What are the properties of ultrasonic waves?
10. What kinds of materials are used to detect ultrasonic waves?

PART-B**Answer ALL questions of the following**

5x10 Marks= 50Marks

1. a) Describe the construction and working of Nicol prism with neat diagram
b) Describe Bragg's spectrometer and explain how the wavelength of X-rays can be determined by using the spectrometer.

OR

2. a) What is meant by interference of light? State the fundamental conditions for production of Interference fringes (4M)
b) Give an account of Powder method of crystal structure analysis with neat Sketch. (6M)

3. a) Explain different pumping mechanisms to achieve population inversion.
b) Mention the characteristics of LASER.

OR

4. a) Explain the construction and working of semiconductor laser (6M)
b) Write the applications of Laser (4M)
5. a) Derive an expression for ionic polarizability.
b) Distinguish Type-I and Type-II superconductors.

OR

6. a) Deduce Clausius-Mosotti Equation. (4M)
b) State and Explain Meissner Effect. (4M)
c) Write few applications of Superconductors. (2M)
7. a) Explain Sol-Gel method for the synthesis of nano materials.
b) Mention the applications of nanomaterials.

OR

8. a) Discuss the Changes of Electrical, magnetic and optical properties with size in nanomaterials. (4M)
b) Explain the Synthesis of nanomaterials using PVD method. (6M)
9. a) Describe piezoelectric method for the production of ultrasonics.
b) Explain any two methods of detection of ultrasonics.

OR

10. a) Define reverberation time (2M)
b) Explain the applications of ultrasonic waves in communication and medicine. [3M]
c) What are ultrasonic waves and explain how the ultrasonic waves are used for biological and industrial applications. (5M)

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **ENGINEERING CHEMISTRY-II**Branch: **COMMON TO CE, MINING**

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Define thermo setting polymer?
2. Name the monomer of Natural rubber.
3. State laws of photochemistry.
4. Write the relation between units of Calorific value.
5. What are the components in LPG?

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. PVC is soft whereas bakelite is hard. Give reasons.
2. How do thermoplastics differ with thermo setting resins (any three?).
3. Write the preparation of butyl rubber.
4. What is doping?
5. State and explain Grotthuss-Draper law.
6. Write the Principle of uv-visible spectroscopy.
7. What are micelles? Give examples.
8. Give some applications of adsorption.
9. What is Cetane rating and write its significance?
10. What is meant by knocking?

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. a) Define is Polymer? Write its classification.
b) Write the preparation, properties and engineering applications of Dacron.

OR

2. a) Explain the compression moulding technique with the help of a neat diagram.
b) Write the differences between addition and condensation polymerisation with examples.

3. a) Write the preparation of natural rubber and explain how the properties will change with vulcanization.
b) What is biodegradable Polymer? Write the preparation and applications of poly vinyl acetate.

OR

4. a) Explain the mechanism of intrinsic doping in polyacetylene
b) Give the preparation, properties and applications of Buna-S and Butyl rubber.
5. a) With neat block diagram explain the instrumentation and applications of uv-visible spectroscopy.
b) State and explain the Einstein-Stark law of Photo Chemical equivalence with example.

OR

6. a) What do you understand by the term quantum yield of a photo chemical reaction. How is it determined experimentally.
b) Explain Electronic, vibrational and rotational transitions in electromagnetic spectrum.
7. a) Define adsorption? Explain Langmuir adsorption isotherm graphically.
b) What is Phase rule? Explain the graphical lines in the phase diagram by taking one Component system i.e. Water.

OR

8. a) What is Gibb's phase rule? Define and explain various terms involved in the phase rule, with suitable examples.
b) Differentiate between physisorption and chemisorption.
9. a) How to prepare synthetic petrol by Fischer Tropsch's Process.
b) The percentage composition of coal sample is C=80%, H₂=4%, O₂=3%, N₂=3% S=2%, Ash=5%, Moisture=3%. Calculate the quantity of air needed for complete combustion of 1 kg of coal.

OR

10. a) How do you refine(fractional distillation)the crude oil?
b) Determine the calorific value (CV) of gas fuel by Junker's gas calorimeter? And calculate CV from the following data Weight of the water circulated =3000grams; volume of the gas fuel burnt-10litr Temperature of incoming water-27°C; Temperature of outgoing water=32°C, Amount of water condensed=3grams: Latent heat of condensation=600calories.

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: MATHEMATICS-IIBranch: **COMMON TO ALL**

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Find $\frac{\partial(u,v)}{\partial(x,y)}$ if $u = x+y$, $v = x-y$.
2. What is the relation between Δ and E ?
3. Write the relationship between Beta and Gamma functions.
4. Evaluate $\int_1^2 \int_1^3 xy^2 dx dy$
5. Define Divergence and curl of vector point functions.

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Is Rolle's theorem applicable to $f(x) = x(x+3) e^{\frac{-1}{2x}}$ in $(-3, 0)$.
2. Find 'C' of Cauchy's mean value theorem for $f(x) = x^2$ and $g(x) = x$ in $[1, 2]$.
3. Evaluate $\Delta^2 \left(\frac{1}{x^2 + 5x + 6} \right)$
4. Show that $E = \Delta + 1$
5. Evaluate $\int_0^1 x^3 (1 - \sqrt{x})^5 dx$
6. Evaluate $\int_0^{\frac{\pi}{2}} \sin^2 \theta \cos^3 \theta d\theta$
7. Evaluate $\iint_A xy dx dy$ where A is the domain bounded by the x -axis, ordinate $x=2a$ and the curve $x^2 = 4ay$.
8. Evaluate $\int_0^1 \int_x^{x^2} xy dx dy$.
9. Show that $\nabla^2(r^n) = n(n+1) r^{n-2}$
10. What is the greatest rate of increase of $u = xyz^2$ at the point $(1, 0, 3)$?

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. Define functional relationship of three functions u_1, u_2, u_3 . Write the necessary condition for existence of functional relationship between two functions $u(x,y)$ and $v(x,y)$. If $u = \frac{x+y}{1-xy}$ and $v = \tan^{-1}x + \tan^{-1}y$, Determine whether u and v are functionally related. If so, find the relationship.

OR

2. Find three positive numbers whose sum is 100 and whose product is maximum.
3. Interpolate by means of Gauss's backward formula, the population of a town for the year 1974, given that

Year	1939	1949	1959	1969	1979	1989
Population(in thousands)	12	15	20	27	39	52

OR

4. Using Lagrange's interpolation formula, find the function $y(x)$ from the flowing table:

x	0	1	2	3
y	-12	0	12	24

5. Find the fourth root of 12, correct to three decimal places using the method of false position.

OR

6. Prove that $\beta(m, n) = \frac{\sqrt{m}\sqrt{n}}{\sqrt{m+n}}$.
7. Evaluate $\int_0^a \int_y^a \frac{x \, dx \, dy}{x^2 + y^2}$ by changing the order of integration.

OR

8. Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} \frac{dx \, dy \, dz}{(x+y+z+1)^3}$
9. Verify stoke's theorem for the vector field $F = (2x-y)i - yz^2j - y^2zk$ over the upper half surface of $x^2 + y^2 + z^2 = 1$, bounded by its projection on the XY- plane.

OR

10. Apply divergence theorem to evaluate $\int \int_s (x+z) \, dy \, dz + (y+z) \, dz \, dx + (x+y) \, dx \, dy$ where s is the surface of the sphere with centre at origin and radius a .

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: MATHEMATICS-IIIBranch: EEE,ECE&CSE

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Test the function whether it is even or odd $f(x) = x^2 \sin x + x \cos x$
2. Define Z-transform.
3. Convert the law $y = ax^2 + bx$ into linear form.
4. Write Adams-Bash forth Predictor formula.
5. Eliminate the arbitrary function $Z = f(y/x)$

II. Answer ALL questions of the following**10x2Marks=20 Marks**

1. Find the Fourier sine transform of $1/x$
2. Find the value of a_0 in the Fourier series $f(x) = x^2 - 2$ when $-2 \leq x \leq 2$
3. Find the Z-transform of $\sin(3n+5)$
4. Find the inverse Z-transform of $\frac{z}{(z-1)(z-2)}$
5. Write the normal equations for $R = a + bv^2$
6. Find the value of the $\int_0^1 f(x) dx$ using trapezoidal rule with $h=0.25$

x	0	0.5	1
f(x)	1	0.8	0.5

7. What are one step and multistep methods? Give examples.
8. Find the Taylor's series for $f(x) = \log(x+1)$
9. Solve $p \tan x + q \tan y = \tan z$
10. Form partial differential equations by eliminating the arbitrary constants a and b from $\log(az-1) = x + ay + b$

PART-B**Answer ALL questions of the following****5x10 Marks= 50Marks**

1. Find the half range cosine series for the function $f(x) = x^2$ in $0 \leq x \leq \pi$ and hence find the sum of the series $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} - \dots = \frac{\pi^2}{12}$
2. Find the Fourier sine transform of xe^{-ax}
3. Find the inverse Z-transform of $\frac{2(Z^2 - 5Z + 6.5)}{(Z-2)(Z-3)^2}$, $2 < |Z| < 3$

OR

OR

4. Solve the difference equation using Z-transform $u_{n+2} - 3u_{n+1} + 2u_n = 0$ given that $u_0 = 0, u_1 = 1$
5. Fit a parabola to the following data

x	1	2	3	4	5
y	10	12	8	10	14

OR

6. Evaluate $\int_0^6 \frac{1}{1+x} dx$ using Simpsons 1/3 rule and Simpsons 3/8 rule and compare the result with its actual value.
7. Find by Taylor's series method the value of y at $x = 0.1$ to five places of decimal form $\frac{dy}{dx} = x^2y - 1$, $y(0) = 1$

OR

8. Solve the following using Runge- Kutta method upto fourth order $y' = y-x$, $y(0) = 2$, $h = 0.2$ find $y(0.2)$
9. Solve the partial differential equation $x^2p^2 + y^2q^2 = 1$

OR

10. A tightly stretched string with fixed end points $x = 0$ and $x = 1$ is initially in a position given by $y(x,0) = y_0 \sin^3 \pi x/l$. if it is released from rest from this position, find $y(x,t)$.

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

I B.TECH II SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: ENGINEERING DRAWING

Branch: COMMON TO CE,ME

Time: 3 hours

Max. Marks: 75M

Answer ALL questions of the following

5x15Marks= 75Marks

1. Draw a diagonal scale of 1/48, showing metres, decimeters, and centimetres and to measure up to 6 metres. Mark a length of 4.85 meters on it.

OR

2. Construct a vernier scale of 1:2500 to read meters and long enough to measure 400m. Mark on it a distance of 178m.
3. A cube of 70mm long edges has its vertical faces equally inclined to the VP. It is cut by auxiliary inclined plane in such that the true shape of the cut part is a regular hexagon. Determine the inclination of the cutting plane with the HP. Draw FV, sectional TV and true shape of the section.

OR

4. A vertical cylinder with a diameter of 70 mm and height of 90 mm is penetrated by a horizontal cylinder with a diameter of 50 mm and 120 mm length. The axis of the horizontal cylinder is parallel to the VP. The axes of the both the cylinders intersect each other at their mid points. Draw three views of the cylinders.
5. A hexagonal prism of side of base 20 mm and length of axis 50 mm is kept on the ground on its base such that two opposite sides of the base are parallel to the V.P. It is cut by AIP inclined at 45 degrees to the H.P. and passing through one of the top corners of the prism. Draw the development of the cut prism.

OR

6. A cylinder is standing on its base on the HP. A pentagonal hole is cut through the cylinder. The axis of the hole is perpendicular to the VP and bisects the axis of the cylinder. The base diameter and height of the cylinder are 70 mm and 90 mm respectively. The hole has a face width of 30 mm. Draw the development of the cylinder. Assume a flat face of the hole perpendicular to the H.P.
7. Draw a perspective view of a square prism having base with a 40mm side and 60mm long axis, resting on its base in the GP with its axis that is 40 mm behind the PP and a vertical face right to the axis inclined at 60 degrees to it. The station point is 50 mm in front of the PP, 90 mm above GP and lies in a CP which is 50 mm towards right of the axis.

OR

8. A hexagonal plane with a 30 mm side lies on the GP with an edge parallel to and 10 mm behind the PP. The station point is 60mm in front of PP, 75 mm above GP and lies in a CP which is at a distance of 40 mm towards right of the centre of the object. Draw its perspective view.
9. What is the difference between conventional drawing and Auto CAD? How to open Auto CAD software and its settings?

OR

10. Explain all draw and modify commands used in auto CAD with examples.

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: ENGINEERING MECHANICS

Branch: Common to CE & ME

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer ALL questions of the following**

5x1Mark=5 Marks

1. What is Distributed Force System?
2. What is Static Indeterminacy?
3. Write the types of Equilibrium
4. Define a Rigid Body
5. Write down the work energy equation for Translation

II. Answer ALL questions of the following

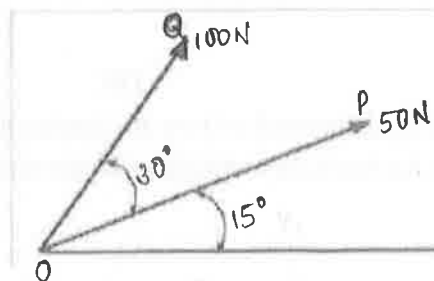
10x2Marks=20 Marks

1. State Lamis Theorem.
2. State the parallelogram law of forces.
3. Explain about Triangle Law of Forces.
4. What is the Converse of Law of Polygon of Forces?
5. State Parallel Axis Theorem.
6. What is product of Inertia?
7. State D Alemberts Principle.
8. Define a Free body diagram
9. State the impulse momentum principle. Write its equation.
10. Define the Law of Conservation of Momentum

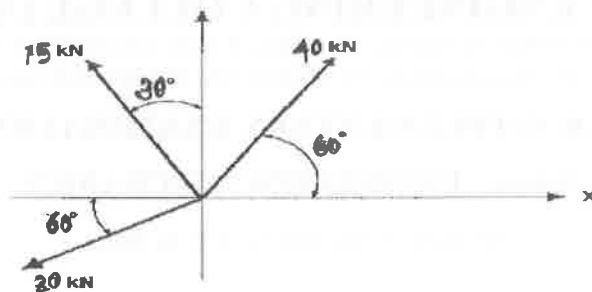
PART-B**Answer ALL questions of the following**

5x10 Marks= 50Marks

1. a) Two forces are acting at a point O as shown in figure. Determine the resultant in magnitude and direction of the force.

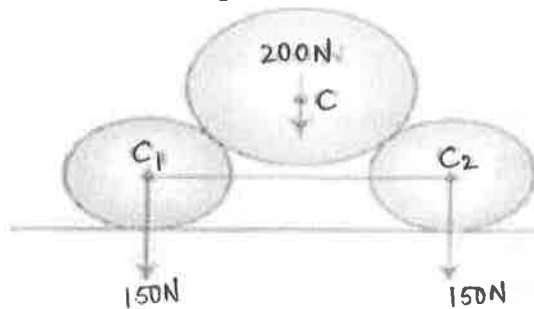


- b) Three forces of magnitude 40 kN, 15 kN and 20 kN are acting at a point O as shown in figure. The angles made by 40 kN, 15 kN and 20 kN forces with X axis are 60° , 120° and 240° respectively. Determine the magnitude and direction of the resultant force.

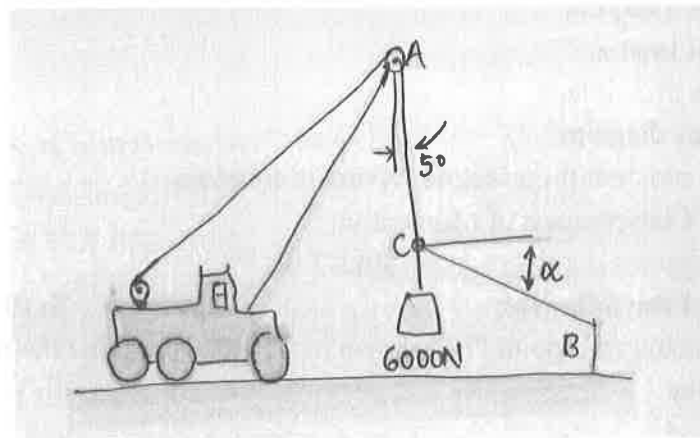


OR

2. Two identical iron spheres each of radius 50mm and weight 150 N is connected with a string of length 160mm, and rest on a horizontal smooth floor. Another sphere of radius 60mm and weight 200N rest over them. Determine the tension in the string and reaction at all contact surfaces.

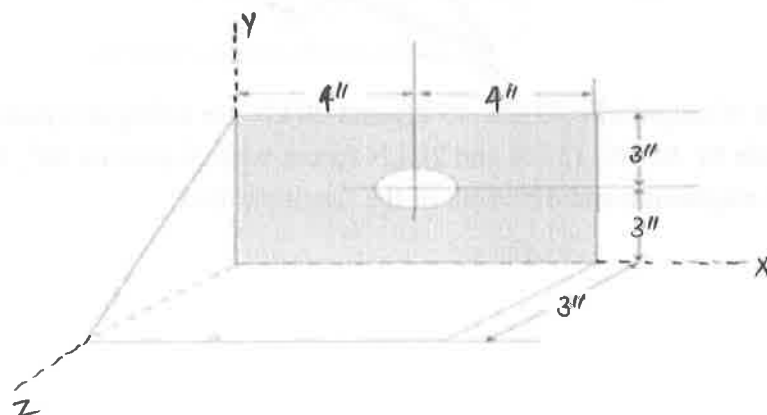


3. Knowing that $\alpha = 20^\circ$ determine the tension (a) in the cable AC (b) in rope BC

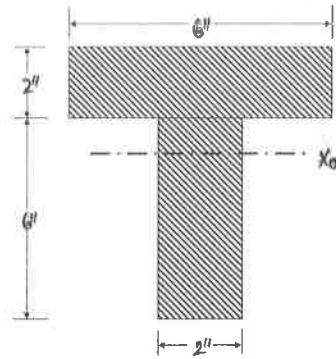


OR

4. A thin plate of sheet metal is composed of two rectangles and a triangle bent as shown in figure. A hole whose area is 12 sq cm. has been cut in the plate. Determine the coordinates of the center of gravity.



5. a) Determine the moment of inertia of the T-section shown in figure about its centroidal X_0 axis.



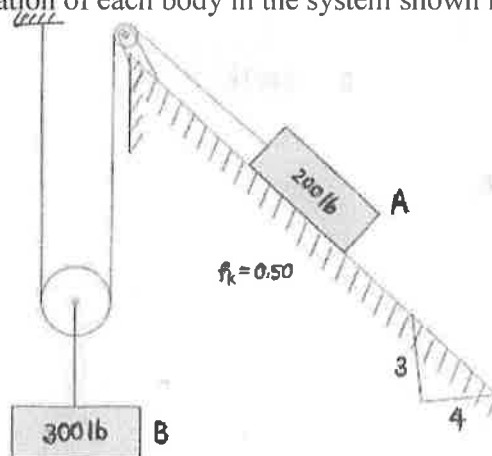
- b) Explain in Detail about Transfer theorem.

OR

6. A cage goes down a main shaft 750 m deep, in 45 s. for the first quarter of the distance only, the speed is being uniformly accelerated and during the last quarter uniformly retarded, the acceleration and retardation being equal. Find the uniform speed of the cage, while traversing the central portion of the shaft.
7. a) A golf ball is hit from an elevated tree to a green; the distance, horizontally, is 110 m. If the initial velocity of the ball is 30 m/s at 53.1° to horizontal, how high is the tree above the green?
b) If the velocity of a particle is defined by $\mathbf{v} = (2t+1)\mathbf{i} + 3\mathbf{j}$ ft, determine the path of the particle in terms of its x and y coordinates.

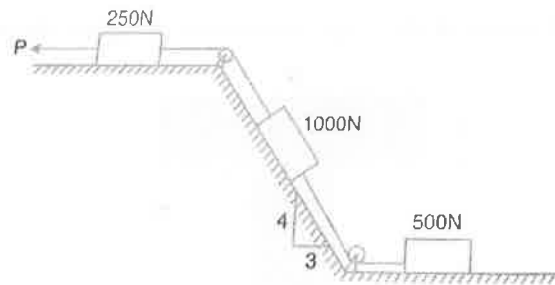
OR

8. a) Find the acceleration of each body in the system shown in figure



- b) Write about D'Alemberts Principle in detail.

9. a) Explain the concept of work. What are the units of work? [3M]
b) Determine the constant force P that will give the system of bodies (shown in Fig.) a velocity of 3 m/sec after moving 4.5 m from rest. Coefficient of friction between the blocks and the plane is 0.3. Pulleys are smooth. [7M]



OR

10. A flexible rope, 24 m long and weighing 8 N/m, passes over two smooth pegs as shown in figure. The rope starts from rest when $d = 3\text{ m}$. Determine the velocity of the rope at the instant when $d = 12\text{ m}$.

