Hall Ticket Number :										

R-15

Code: 5G511

I B.Tech. I Semester Supplementary Examinations October 2020

Engineering Mechanics - Statics

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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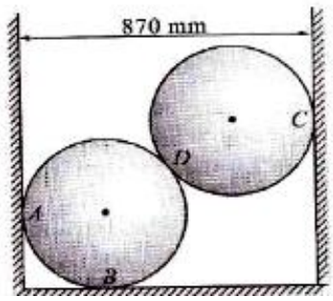
UNIT–I

1. a) How do you define the system of forces? Sketch at least three systems of forces. 4M

   b) Two smooth spheres of weight 100N and radius 250 mm each are in equilibrium each are in equilibrium in a horizontal channel of width 870 mm as shown in the Figure 1. Find the reactions at the surfaces of contact A, B, C, D assuming all surfaces to be smooth.

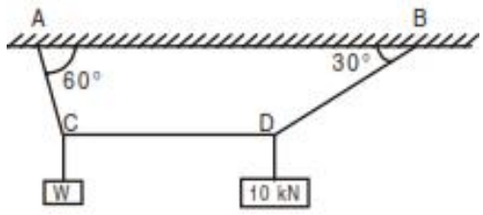


10M

OR

2. a) State and prove Varignon's theorem. 6M

   b) A cord supported at A and B carries a load of 10 KN at D and a load of W at C as shown in Fig. 3. Find the value of W so that CD remains horizontal.

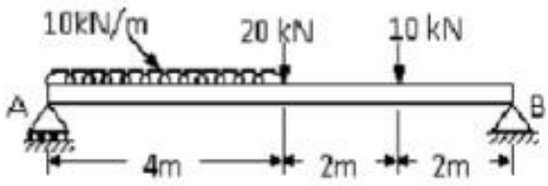


8M

UNIT–II

3. a) Explain various types of loads acting on beams. 6M

   b) A beam AB is located supported and loaded as shown in Figure. Find the reactions at the supports.

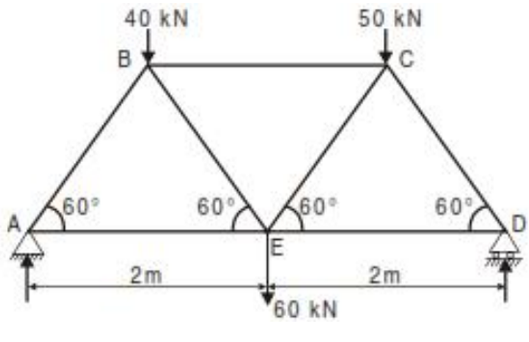


8M

OR

4. a) Discuss the assumptions made in the analysis of simple truss. 4M

   b) Determine the forces in all the members of the truss shown in Fig. and indicate the magnitude and nature of forces on the diagram of the truss. All inclined members are at 60° to horizontal and length of each member is 2 m.

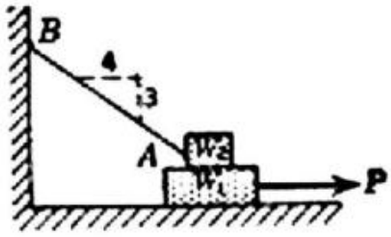


10M

UNIT–III

5. a) Define the terms: Friction, limiting force of friction, co-efficient of friction and angle of friction. 4M

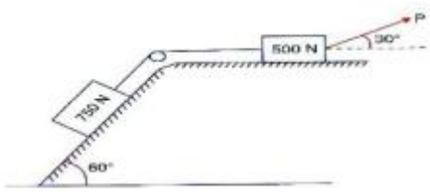
   b) A block of weight W1= 200 N rests on a horizontal surface and supports on top of it another block of weight W2= 50 N. The block W2 is attached to a vertical wall by the inclined string AB. Find the magnitude of the horizontal force P, applied to the lower block as shown, that will be necessary to cause slipping to impend. The coefficient of static friction for all contact surfaces is μ=0.3 as shown in figure.



10M

OR

6. What is the value of P in the system shown in figure to cause the motion of 500 N block to the right side? Assume the pulley is smooth and the coefficient of friction between other contact surfaces is 0.20.

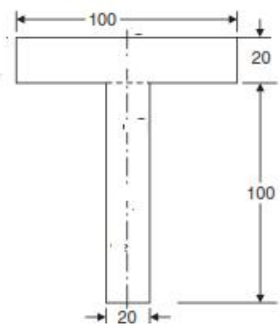


14M

UNIT–IV

7. a) Determine centroid of semicircle whose radius is R. 6M

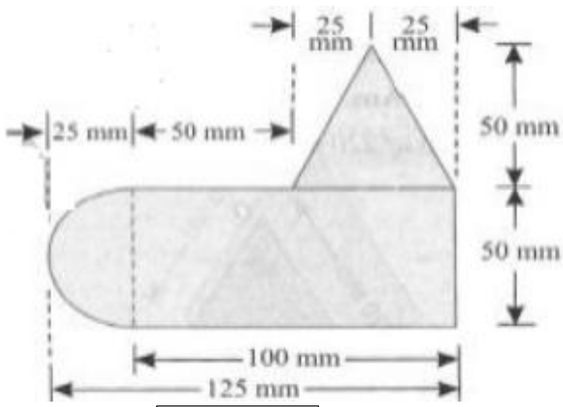
   b) Locate the centroid of the T-section shown in the Fig.



8M

OR

8. Uniform lamina shown Figure. consists of rectangle, a semi circle and a triangle. Find the center of gravity.



14M

UNIT–V

9. a) State and prove parallel axis theorem. 7M

   b) Derive the expression for moment of inertia of a triangle about centroidal axis. 7M

OR

10. Find the mass moment of inertia of a right circular cone of base radius ‘R’ and mass ‘M’ about the axis of the cone. 14M

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Hall Ticket Number :										

R-15

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations October 2020

Engineering Mathematics-I

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Solve $x\frac{dy}{dx}+y=x^3y^6$ 14M

OR

2. A body originally at 80° C cools down to 60° C in 20 minutes, the temperature of the air being 40° C. What will be the temperature of the body after 40 minutes from the original and when will be the temperature be 50° C. 14M

UNIT–II

3. Solve $(D^2+4)y=x^2+\cos 2x$ 14M

OR

4. Using the method of variation of parameters, solve $(D^2+4)y=\tan 2x$ 14M

UNIT–III

5. a) Verify Rolle's theorem for $f(x)=\frac{\sin x}{e^x} in(0,®)$ 7M

   b) Expand $\sin x$, by using Maclaurin's theorem. 7M

OR

6. a) Verify Lagrange's Mean value theorem for $f(x)=e^x in[0,1]$ 7M

   b) Using Maclaurin's series, expand $f(x)=\log(1+x)$ 7M

UNIT–IV

7. If $u=x^2-2y, v=x+y+z, w=x-2y+3z$,then find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ 14M

OR

8. Find the maximum and minimum values of x^3+y^3-3axy 14M

UNIT–V

9. Trace the curve $r=a(1-\cos^{-})$ 14M

OR

10. Trace the curve $x^3+y^3=3axy$ 14M

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Hall Ticket Number :										

R-15

Code: 5GC12

I B.Tech. I Semester Supplementary Examinations October 2020

Engineering Chemistry

(Common to CE, ME, CSE & IT)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) What is hardness of water? Mention its units?
   b) Describe the desalination process by reverse osmosis with a neat sketch.

OR

2. a) Write a note on internal treatment?
   b) What is break point chlorination? State its significance?

UNIT–II

3. What are fuel cells? Describe the working principle of methanol-oxygen fuel cell with reactions.

OR

4. a) What is concentration cell corrosion and galvanic corrosion?
   b) Calculate the standard emf of Ni-Ag cell whose E^0_{Ni} and E^0_{Ag} are -0.25 and +0.83 respectively also write cell representation.

UNIT–III

5. a) Distinguish between thermoplastic and thermosetting polymers.
   b) Write a note on compounding of rubber?

OR

6. a) Describe doped conducting polymers with suitable example.
   b) Write a note on vulcanization of rubber.

UNIT–IV

7. a) Discuss any five characteristics of a good fuel?
   b) Classify the fuels with examples?

OR

8. a) Write a note on production and uses of producer gas, water gas and Bio gas.
   b) Define knocking? Write about octane number?

UNIT–V

9. a) What are lubricants? Write any three properties and applications of lubricants.
   b) What are refractories? Discuss any three properties of refractories?

OR

10. Explain the mechanism of (i) thin film lubrication, (ii) thick film lubrication

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Hall Ticket Number :										

R-15

Code: 5G111

I B.Tech. I Semester Supplementary Examinations October 2020

Problem Solving Techniques and Introduction to C Programming

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Give a comparison between system and application softwares with examples.
   b) Write an algorithm to find the greatest number among the three given numbers.

OR

2. a) Give the block diagram of a computer. Explain functionality of each component.
   b) Write an algorithm to calculate the roots of a quadratic equation.

UNIT–II

3. a) What is the need of explicit type conversion in C? How to cast the data?
   b) What is an integer constant, floating constant and character constant? Give valid examples.

OR

4. Explain with examples the different types of operators used in C.

UNIT–III

5. a) In what way a do – while loop differs from while loop. Explain.
   b) Write a C program to print all the prime numbers between 1 to 100

OR

6. a) How does a switch statement works? List the difference between switch and if else ladder statement.
   b) Write a program to demonstrate ‘goto’ statement.

UNIT–IV

7. a) Write a program to print an array in reverse order
   b) Write a C Program to delete ‘n’ characters in a given string

OR

8. a) What is an Array? Explain different types of Array with examples.
   b) What is String? Explain any three string handling functions with examples.

UNIT–V

9. a) What is the scope of variables of type extern, auto, register and static? Explain with example.
   b) What is meant by user defined function? Explain with an example C program

OR

10. a) What is a function? What are its advantages? Explain various parameter passing techniques.
    b) Write a function that checks whether a given year is leap year or not.

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Hall Ticket Number :										

R-15

Code: 5G512

I B.Tech. I Semester Supplementary Examinations October 2020

Engineering Graphics-I

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Construct an ellipse, when the distance of the focus from the directrix is equal to 60 mm and eccentricity 2/3. Also draw a normal and tangent to the curve at a point 35 mm from the focus. 14M

OR

2. a) Construct a parabola when its base is equal to 100mm and axis is equal to 65mm by rectangle method. 7M

   b) A point P is 30mm and 50mm respectively from two straight lines which are at right angles to each other. Draw the rectangular hyperbola from P within 10mm distance from each line. 7M

UNIT–II

3. Draw a hypo-cycloid of a circle of 40 mm diameter, which rolls inside another circle of 160 mm diameter, for one revolution counter clockwise. Draw a tangent and normal to it at a point 65 mm from the center of the directing circle. 14M

OR

4. a) Draw an involute of a circle of 50 mm diameter. Also, draw a normal and tangent at any point on the curve. 7M

   b) Draw an involute of a equilateral triangle of 30mm side. Also draw a normal and tangent at a point 50mm from center of triangle. 7M

UNIT–III

5. a) A point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the V.P. and 40 mm below the H.P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines joining (i) their top views and (ii) their front views. 7M

   b) A point P is 50 mm from both the reference planes. Draw its projections in all possible positions. 7M

6. A point at 25 above the reference line ***xy*** is the front view of two points A and B. The point A is 40 behind V.P and the point B is 50 in front of V.P. Draw the projections of the points and state their positions relative to the planes of projections and quadrants in which they lie 14M

UNIT–IV

7. A thin rectangular plate of sides 60 mm X 30 mm has its shorter side in the V.P. and inclined at 30^0 to the H.P. Project its top view if its front view is a square of 30 mm long sides. 14M

OR

8. A rectangle ABCD of size 40 x 25 has the corner A, 10 above H.P and 15 in front of V.P. All the sides of the rectangle are equally inclined to H.P and parallel to V.P. Draw its projections. 14M

UNIT–V

9. A line AB 120 mm long is inclined at 45^0 to HP and 30^0 to the VP. It's midpoint C is in VP and 20 mm above HP. The end A is in third quadrant and B is in first quadrant. Draw the projections of the line using the auxiliary plane method 14M

OR

10. An equilateral triangle ABC of sides 75 mm long has its side AB in the V.P. and inclined at 60^0 to the H.P. its plane makes an angle of 45^0 with the V.P. Draw its projections by auxiliary plane method. 14M

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