

Code: 5G511

I B.Tech. I Semester Supplementary Examinations May 2018

Engineering Mechanics-Statics

(Common to CE and ME)

Max. Marks: 70

Time: 3 Hours

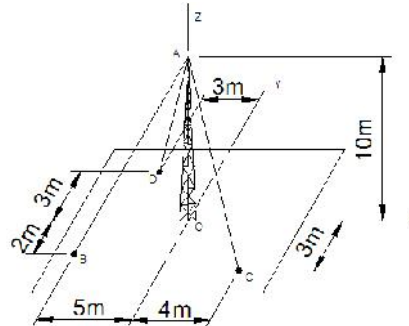
Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) State and prove Varignon's theorem. 5M
 b) Differentiate between:
 (i) Concurrent and non-concurrent forces,
 (ii) Coplanar and non-coplanar forces and
 (iii) Moment of a force and couple. 9M

OR

2. Determine the resultant of the tension forces acting at point A of the transmission tower. The magnitude of tensions along cables AB, AC and AD are respectively 1000N, 2000N and 1800N.



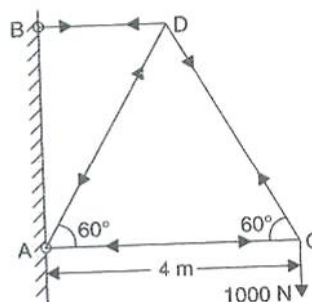
14M

UNIT-II

3. a) What are the advantages of method of section over method of joints? 4M
 b) A simply supported beam of length 5 m carries a uniformly increasing load of 800N/m at one end to 1600 N/m at the other end. Calculate the reactions at both ends. 10M

OR

4. Determine the forces in all the members of a cantilever truss shown in figure.



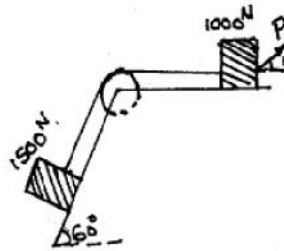
14M

UNIT-III

5. A uniform ladder of length 10 m and weighing 20 N is placed against a smooth vertical wall with its lower end 8 m from the wall. In this position the ladder is just to slip. Determine (i) The co-efficient of friction between the ladder and the floor and (ii) Frictional force acting on the ladder at the point of contact between ladder and floor. 14M

OR

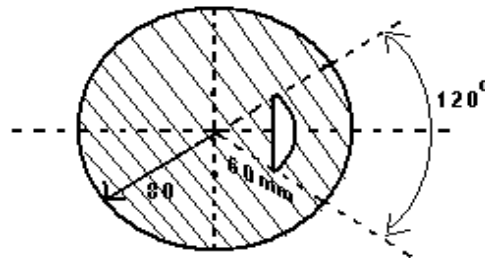
6. a) State the laws of friction. 4M
 b) Referring to the figure, determine the least value of the force 'P' to cause motion to impend rightward. Assume the co-efficient of friction under the blocks to be 0.2 and the pulley to be frictionless.



10M

UNIT-IV

7. a) State and prove Pappu's theorems. 6M
 b) Locate the centroid of the shaded area as shown in fig. resulting from removing the circular segment of 60 mm radius from the circular plate of 80 mm radius



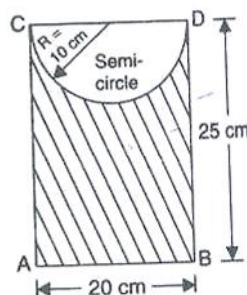
8M

OR

8. In a steel cylinder with a 20cm base diameter and a 30cm height, a vertical hole of 4cm base diameter is drilled upto half the depth from the top and the portion is filled with lead, whose density is 11370 kg/m^3 . Determine the centre of mass of the composite body. Take the density of steel as 7850 kg/m^3 . 14M

UNIT-V

9. a) State and prove parallel axis theorem. 6M
 b) Find the moment of inertia of the area shown shaded in figure about edge AB.



8M

OR

10. A brass cone with base diameter of 400 mm and height of 225 mm is placed on a vertical aluminium cylinder of height 300 mm and diameter 400 mm. Density of brass = 85 kN/m^3 and density of aluminium = 25.6 kN/m^3 . Determine the mass moment of inertia of the composite body about the vertical geometrical axis. 14M

Hall Ticket Number :

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R-15

Code: 5G512

I B.Tech. I Semester Supplementary Examinations May 2018

Engineering Graphics - I

(Common to CE and ME)

Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. Construct a parabola, with the distance of the focus from the directrix as 50. Also, draw normal and tangent to the curve, at a point 40 from directrix.

OR

2. Construct a rectangular hyperbola, when a point P on it is at a distance of 18 and 34 from two asymptotes.

UNIT-II

3. Construct a cycloid, given the diameter of the generating circle as 40. Draw tangent to the curve at a point on it, 35 from the line.

OR

4. Draw a hypocycloid of a circle of 30 diameter, which rolls inside another circle of 160 diameter for one revolution counter clock-wise.

UNIT-III

5. A point 30 above xy line is the plan view of two points P and Q. The elevation of P is 45 above the H.P while that of the point Q is 35 below H.P. Draw the projection of the points and state their positions with reference to the principle planes and the quadrants in which they lie.

OR

6. The front view of a line AB measure 60 and make angle of 45° with xy. A is in H.P and V.T of the line is 15 above H.P. The line is inclined at 30° to V.P. Draw the projections of AB and determine its true length and inclination with H.P. Also, locate its H.T.

UNIT-IV

7. A circular plate of 50 diameter appears as an ellipse in the front view, having its major axis 50 long and minor axis 30 long. Draw the top view when the major axis of the ellipse is horizontal.

OR

8. A rectangular pentagon of length of 30 side has one its corners on V.P and its surface is inclined at 60° to V.P. The edge, opposite to the corner on V.P, makes an angle if 45° with H.P. draw the projection of the plane.

UNIT-V

9. A rectangular plane of size 60X40, is inclined to H.P. by an angle of 30° . The top view of longer edge of which is making an angle of 45° with V.P. Draw the projections, by auxiliary plane method.

OR

10. A thin regular hexagonal plate of 30 side is resting on a corner on H.P. The end of the longest diagonal through the corner is 40 above H.P. Draw the projection of the plate. Also, draw auxiliary front view on an A.V.P, inclined at 45° with V.P.

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R-15

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations May 2018

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)

UNIT-I

1. a) Solve the differential equation $(1 + y^2)dx + (x - \tan^{-1} y)dy = 0$ 7M
- b) Show that the system of confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$, where λ is a parameter, is self-orthogonal. 7M

OR

2. a) Solve $\frac{dy}{dx} + \frac{y}{x \log x} = \frac{\sin 2x}{\log x}$. 7M
- b) The temperature of a body drops from 80°C to 60°C in 20 minutes when the temperature of the surrounding air is 25°C. Find the temperature after 40 minutes. 7M

UNIT-II

3. a) Solve $(D^2 + 9)y = \sec 3x$, by using method of variation of parameters. 7M
- b) Solve $(D^2 + 4)y = x \sin x + (1 + x^2)e^x$ 7M

OR

4. a) Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$. 7M
- b) Solve $(D + 2)(D - 1)^2 y = e^{-2x} + 2 \sinh x$. 7M

UNIT-III

5. a) Find the series solution of the equation $2x(1-x)\frac{d^2y}{dx^2} + (1-x)\frac{dy}{dx} + 3y = 0$. 7M
- b) Find the Taylor's series expansion of $f(x) = \log(1+x)$, about $x = 0$. 7M

OR

6. a) Solve in series the equation $\frac{d^2y}{dx^2} - y = 0$. 7M
- b) Prove that $\frac{v-u}{1+v^2} < \tan^{-1}v - \tan^{-1}u < \frac{v-u}{1+u^2}$ by using LMV theorem. 7M

UNIT-IV

7. a) If $u = e^{x^2+y^2+z^2}$, then find $\frac{\partial^3 y}{\partial x^3}$ 7M
- b) Find the maximum value of $x^2 + y^2 + z^2$, given that $xyz = a^3$. 7M

OR

8. a) Find the maximum and minimum values of $\sin x + \sin y + \sin(x+y)$. 7M
- b) If $u = f(x,y)$, where $x = u+v$ and $y = uv$ then show that 7M

$$u \frac{\partial z}{\partial u} + v \frac{\partial z}{\partial v} = x \frac{\partial z}{\partial x} + 2y \frac{\partial z}{\partial y}.$$

UNIT-V

9. Trace the curve $y^2(a+x) = x^2(3a-x)$. 14M

OR

10. Trace the curve $r = a(1 + \cos\theta)$. 14M

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Code: 5G111

I B.Tech. I Semester Supplementary Examinations May 2018

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)

UNIT-I

1. a) Explain briefly about different computer languages. 7M
b) Explain the software development method in detail. 7M

OR

2. a) What is algorithm? What are the main steps followed in the development of an algorithm? 8M
b) Draw flowchart and write algorithm to find sum of the digits in a given number. 6M

UNIT-II

3. a) Explain about the basic data types in C language with examples 8M
b) Write a C program to swap (exchange) the values of two variables without using temporary variable. 6M

OR

4. a) What is meant by type conversion? Why is it necessary? Explain about implicit and explicit type conversion with examples. 9M
b) Write a program to enter two numbers and find the largest of them. Use conditional operator. 5M

UNIT-III

5. a) Explain various selection statements available in C language with examples. 8M
b) Write a program to print whether a given number is prime or not. 6M

OR

6. a) Explain various iterative statements available in C language with examples. 8M
b) Write a program to find out whether the given number is Armstrong or not? 6M

UNIT-IV

7. a) What is Array? Discuss about the initialization and accessing of array elements in one dimensional and two dimensional arrays. 8M
b) Write a program to find the maximum element of an array. 6M

OR

8. a) Explain the following string handling functions with examples:
(i) strcpy() (ii) strcat() (iii) strcmp() (iv) strlen() 8M
b) Write C program to concatenate two strings without using strcat() function 6M

UNIT-V

9. a) Explain about call by value and call by reference mechanisms with examples 8M
b) What are the standard header files used in 'C'? Explain their functions. 6M

OR

10. Explain about different storage classes with examples 14M

Code: 5GC12

I B.Tech. I Semester Supplementary Examinations May/June 2018

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)

UNIT-I

1. a) A sample of water on analysis has been found to contain the following
 $\text{Ca}(\text{HCO}_3)_2$: 32.4ppm; CaSO_4 : 13.6ppm; MgCl_2 : 19.0ppm; $\text{Mg}(\text{HCO}_3)_2$:
 14.6ppm. Calculate temporary permanent hardness of sample in degree
 French.
 (At wt. of Ca, Mg, O, C, Cl, S, H are 40, 24, 16, 12, 35.5, 32 and '1'
 respectively) 7M
- b) What are boiler troubles? Explain scales and sludges in details. 7M

OR

2. a) Describe the estimation of hardness of water by EDTA method. 7M
- b) What is meant by sterilization of water? Explain how sterilization of water is
 done by using chlorine and ozone. 7M

UNIT-II

3. Answer the following
- (a) Electro chemical cells 7M
- (b) Lithium Ion batteries 7M

OR

4. a) What is meant by galvanic corrosion? Explain in details. 7M
- b) What are the factors influencing corrosion reaction? 7M

UNIT-III

5. a) Explain preparation, properties and applications of Bakelite. 7M
- b) Define plastics and how they are classified? Explain. 7M

OR

6. a) Define conducting polymer? Write the synthesis and application of Polyaniline? 7M
- b) Write notes on compounding of rubber. 7M

UNIT-IV

7. a) Write manufacturing of metallurgical coke by Otto Hoffmann's by product
 oven process in detail. 7M
- b) Define calorific value of a fuel sample? Write the classification and units of
 calorific value of a fuel sample? 7M

OR

8. a) Write short notes on (i) Producer gas, (ii) Octane number 7M
- b) What is synthetic petrol? How it is prepared by Fischer Tropsch's process. 7M

UNIT-V

9. a) Write setting and hardening of cement with suitable equations? 7M
- b) Define refractories? Write the application of refractories? 7M

OR

10. a) What are lubricants? Explain any two important properties of lubricants? 7M
- b) Write notes on Rocket propellants. 7M
