

Code: 7G512

I B.Tech. I Semester Supplementary Examinations November 2019

Engineering Mechanics-Statics

(Common to CE & ME)

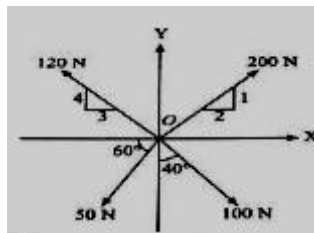
Max. Marks: 70

Time: 3 Hours

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

UNIT-I

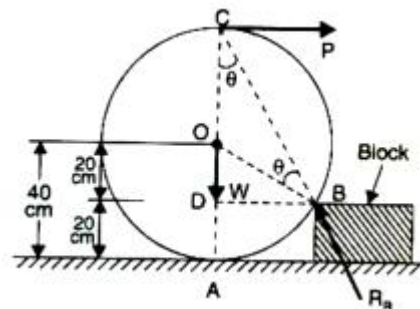
1. a) State and prove Lami's theorem. 6M
- b) Determine the magnitude and direction of resultant of the given concurrent force system as shown in Fig.2.



8M

OR

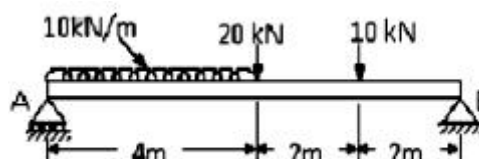
2. A roller of radius 40 cm, weighing 3000 N is to be pulled over a rectangular block of height 20 cm as shown in figure, by a horizontal force applied at the end of a string wound round the circumference of the roller. Find the magnitude of the horizontal force which will just turn the roller over the corner of the rectangular block. Also determine the magnitude and direction of reactions at A and B. All surfaces may be taken as smooth.



14M

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) Explain the reactions at i) fixed support and ii) roller support. 4M
- b) A simply supported beam of length 5 m carries a uniformly increasing load of 600 N/m at one end to 1200 N/m at the other end. Calculate the reactions at both ends. 10M

UNIT-III

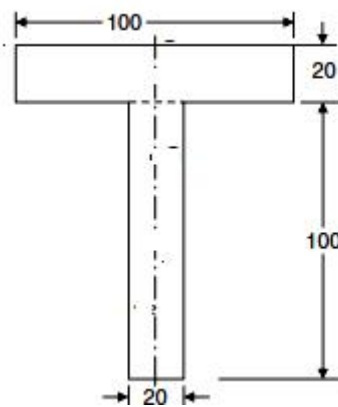
5. a) State the laws of static and dynamic friction. 6M
- b) A body, resting on a rough horizontal plane, required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction 8M

OR

6. A block weighing 1500 N, overlying a 10° wedge on a horizontal floor and leaning against a vertical wall, is to be raised by applying a horizontal force to the wedge. Assuming the coefficient of friction between all the surface in contact to be 0.3, determine the minimum horizontal force required to raise the block. 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.



OR

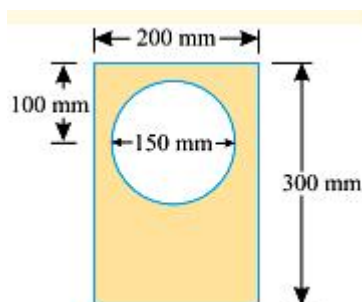
8. a) State and explain Pappus and Guldinus theorems. 7M
- b) Determine surface area and volume of sphere using the Pappus and Guldinus theorems. 7M

UNIT-V

9. 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

OR

10. a) State and prove perpendicular axis theorem. 6M
- b) Find the moment of inertia of a hollow section shown in Fig. about an axis passing through its centre of gravity or parallel X-X axis.



8M

Code: 7GC12

I B.Tech. I Semester Supplementary Examinations November 2019

Engineering Chemistry
(Common to CE, ME & CSE)

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) Give the detailed procedure for the estimation of dissolved oxygen present in water with principle and chemical equations. 7M
- b) With the help of neat diagram, explain the use of Zeolite process for softening of water and its limitations. 7M

OR

2. a) What is the principle of EDTA method? Describe the estimation of hardness of water by EDTA method. 7M
- b) Calculate carbonate and non carbonate hardness of a sample of water contains the following salts per litre.
Mg(HCO₃)₂=7.3mg, Ca(HCO₃)₂=16.2mg, MgCl₂=9.5mg, CaSO₄=13.6mg. 7M

UNIT-II

3. Explain the composition ,applications and advantages of the following cells
(i)Ni-Cd cell & (ii) Lithium ion cell. 14M

OR

4. a) Define corrosion. Explain dry corrosion and its mechanism. 7M
- b) Explain the following methods for preventing the corrosion.
(i)electroplating (ii) Electrolessplating 7M

UNIT-III

5. a) Explain with examples the terms: addition polymerization, condensation polymerization and co-polymerization. 7M
- b) How the following are produced?
(i) Buna-s (ii) polyurethane. Mention their properties and uses. 7M

OR

6. Give an account of preparation, properties and engineering uses of the following
(i) PVC (ii) Nitrile rubber (iii) poly phosphazines 14M

UNIT-IV

7. What are the characteristics of metallurgical coke? Describe the manufacture for metallurgical coke by Otto-Hoffmann's method. 14M

OR

8. a) With a neat diagram describe the orsat's gas analysis method. 10M
- b) Define calorific value of a fuel. Distinguish gross and net calorific value of fuel. 4M

UNIT-V

9. What are rocket propellants? How are they classified? What are the requirements for the selection of a good propellant? 14M
- OR**
10. What is setting and hardening of cement? Write the chemical reactions that take place during the setting and hardening of cement and explain? 14M

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R-17

Code: 7GC14

I B.Tech. I Semester Supplementary Examinations November 2019

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) Define the rank of the matrix and find the rank of the following matrix

$$\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$$

7M

- b) Test for consistency and solve $5x+3y+7z=4$, $3x+26y+2z=9$, $7x+2y+10z=5$

7M

OR

2. Find the eigen values and the corresponding eigen vectors of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

14M

UNIT-II

3. a) Reduce the quadratic form $10x^2 + 2y^2 + 5z^2 - 4yz - 10zx + 5xy$ to the canonical form by linear transformation.

7M

- b) Prove that the matrix $\frac{1}{\sqrt{3}} \begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$ is Unitary matrix.

7M

OR

4. Reduce the quadratic form $2x_1x_2 + 2x_1x_3 - 2x_3x_2$ to canonical form by an orthogonal reduction and discuss its Nature. Also find the model matrix.

14M

UNIT-III

5. a) The number N of bacteria in a culture grew at a rate proportional to N. the value of N was initially 100 and increased to 332 in one hour. What was the value of N after $1\frac{1}{2}$ hours?

7M

- b) Prove that the system of parabolas $y^2 = 4a(x + a)$ is self orthogonal.

7M

OR

6. a) A body is kept in air with temperature 25°C cools from 140°C to 80°C in 20 minutes. Find the when the body cools down to 35°C

7M

- b) A bacterial culture, growing exponentially, increases from 200 to 500 grams in 1 hour. How many grams will be present after 90 minutes?

7M

UNIT-IV

7. a) Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$ 7M

b) Solve $\frac{d^3y}{dx^3} - y = e^x + \sin 3x + 2$ 7M

OR

8. Solve $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = xe^{3x} + \sin 2x$ 14M

UNIT-V

9. a) If $x + y + z = u, y + z = uv, z = uvw$, then evaluate $\frac{\partial(x, y, z)}{\partial(u, v, w)}$ 7M

b) Find the first and second order partial derivatives of $f(x, y) = ax^2 + 2hxy + by^2$ and

verify $\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial y \partial x}$ 7M

OR

10. Find the three positive numbers whose sum is 100 and whose product is maximum. 14M

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Code: 7G111

I B.Tech. I Semester Supplementary Examinations November 2019

Problem Solving Techniques and 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) Give a comparison between system and application softwares with examples. 7M
 b) Write an algorithm to find the greatest number among the three given numbers. 7M

OR

2. a) Discuss about different computer languages with examples. 7M
 b) Describe the process of program development. 7M

UNIT-II

3. a) Describe the structure of a C program with example 7M
 b) What is the purpose of the comma operator? Within which control statement does the comma operator usually appear? 7M

OR

4. Explain with examples the different types of operators used in C. 14M

UNIT-III

5. a) Differentiate between if statement and if-else statement with suitable examples and proper syntax. 7M
 b) Give the control flow diagram of the *for loop*. How is the execution of 'for' loop proceeds? 7M

OR

6. a) Discuss selection statements with suitable examples for each. 7M
 b) Write a C program to check whether a given number is Palindrome or not 7M

UNIT-IV

7. a) Define an array. Write a program to find the largest and smallest element in a given array 7M
 b) Write a 'C' program to read a string from keyboard and print the numbers of uppercase letters, lower case letters, digits, spaces and special characters. 7M

OR

8. a) What is meant by arrays of strings? When it will be used? Explain with a 'C' program. 7M
 b) Write a C program that reads characters from the keyboard and writes them to a disk file until the user types a dollar sign. 7M

UNIT-V

9. a) What is the scope of variables of type extern, auto, register and static? Explain with example. 10M
 b) What is meant by user defined function? Explain with an example C program 4M

OR

10. a) Explain about calling function, called function and actual and formal arguments. 7M
 b) Compare call by value and call by reference and explain using suitable example 7M

Code: 7GC11

I B.Tech. I Semester Supplementary Examinations November 2019

Technical English and Professional Communication

(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 the alternative technology suggested by E.F.Schumacher to make things better, in “ Technology with a Human Face”
- b) Fill in the blanks in the following sentences using the hints given in brackets
 - i) Be bold. Don't act weak and _____. (a word with the suffix –less)
 - ii) They own an acre of *fertile* land in the village. (Replace the italicized word with its Antonym)
 - iii) The man stared _____ the paper in his hand (towards/at)
 - iv) The music is too loud. Could you _____ the volume please? (turn down/ turn up)
 - v) Can I have a _____, please? (pear/pare)

OR

2. What are the key elements of communication? Explain.

UNIT-II

3. a) What are the main ways in which human development has affected climate patterns on the earth?
- b) Write a letter of application in response to an advertisement for the post of Software developer in Google solutions, Hyderabad.

OR

4. Discuss flow of Communication? Illustrate it with examples.

UNIT-III

5. a) Discuss two kinds of technologies currently used to generate solar power on a large scale.
- b) Complete the following sentences with appropriate words chosen from those in brackets.
 - i) I just read a story about a man without a _____. (Shade/Shadow)
 - ii) There is a _____ shop on the campus. (Stationery/Stationary)
 - iii) It was not a _____ thing to do. (Sensible/Sensitive)
 - iv) Everyone said that the Court's verdict was _____. (Fare/Fair)
 - v) To prove his points, he _____ an example. (Cited/Sited)

OR

6. Explain the significance of Proxemics and Kinesics in effective communication?

UNIT-IV

7. a) How according to Sir C.V. Raman, can rainwater as well as the water of rivers be prevented from going waste?
- b) You have been asked to write a report on the infrastructure (furniture, equipment, classroom, workshops, labs, computer centers, hostels and libraries) available in your college.

OR

8. Define Noise? Classify different barriers of communication?

UNIT-V

9. According to Swami Vivekananda, what are the two ways in which one can work without expecting anything in return?

OR

10. Explain briefly four communication models and its importance?

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R-17

Code: 7G511

I B.Tech. I Semester Supplementary Examinations November 2019

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)

UNIT-I

1. Construct a regular Pentagon and Hexagon of side length 50mm 14M

OR

2. Construct a parabola, when the distance of the focus from the directrix is 50mm. Also draw a tangent and normal to the curve at a point 35mm from the directrix 14M

UNIT-II

3. Draw an involute of a square of side length 30mm. Also draw a normal and tangent to the curve at a distance of 90mm from the center of the square 14M

OR

4. Draw an involute of a pentagon of side length 30mm. Also draw a normal and tangent to the curve at a distance of 90mm from the center of the pentagon 14M

UNIT-III

5. Draw the projections of the following points on the same ground line, keeping the projections 25mm apart. 14M

- a. A, in the H.P & 20mm, behind the V.P
- b. B, 40mm above the H.P & 25mm in front of the V.P.
- c. C, in the V.P & 40mm above the H.P.
- d. D, 25mm below the H.P & 25mm behind the V.P.
- e. E, 15mm above the H.P & 50mm behind the V.P.
- f. F, 40mm below the H.P & 25mm in front of the V.P.
- g. G, in both the H.P & the V.P

OR

6. A 100mm long line is parallel to and 40mm above the H.P. Its two ends are 25mm and 50mm in front of the V.P respectively. Draw its projections and find its inclination with the V.P 14M

UNIT-IV

7. a) A square plane of side length 30mm is parallel to H.P. and perpendicular to the V.P. The plane is lying from H.P. at a distance of 30mm. Draw its projections 7M

b) A pentagon plane of side length 30mm is parallel to V.P. and perpendicular to H.P. with a side perpendicular to H.P. The plane is 30mm in front of V.P. Draw its projections 7M

OR

8. A hexagonal plate of side 30mm is placed with a side on VP and surface inclined at 45° to VP and perpendicular to HP. Draw the projections 14M

UNIT-V

9. A straight line AB of 75 length is inclined at 30° to H.P. The end A of the line is 25 above H.P. and 20 in front of V.P. Draw the projections by auxiliary plane method 14M

OR

10. A rectangular plane ABCD of size 100 x 60, is inclined to V.P. by an angle of 45°. Draw the projections by auxiliary plane method 14M
