

**Code: 7G513**

I B.Tech. I Semester Supplementary Examinations August 2021

**Basic Engineering Drawing**  
( Computer Science and Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit ( 5x14 = 70 Marks )

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**UNIT-I**

- 1. a) Construct a regular pentagon and hexagon by general method. 10M
- b) Bisect a straight line AB of length 75mm. 4M

**OR**

- 2. A fixed point 70mm from fixed straight line. When the distance between point from F and the distance between point from directrix is 3/4. Name the curve and draw the curve at least 9 plots and also draw tangent and normal at a point 60mm from F. 14M

**UNIT-II**

- 3. A line AB, 90mm long, makes an angle 30° with the H.P. Its end A is 30mm above H.P. and 25mm in front of the V.P. Draw its projections 14M

**OR**

- 4. A line AB, 55mm long has its end A 25mm in front of the V.P and in the H.P. The line is inclined at 45° to the V.P. Draw the projections 14M

**UNIT-III**

- 5. A semicircular plate of 80 mm diameter has its straight edge in the VP & inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections. 14M

**OR**

- 6. Draw the projections of a circle of 50mm diameter, having its plane vertical and inclined at 30° to the VP. Its centre is 30mm above the HP and 20mm in front of the VP. 14M

**UNIT-IV**

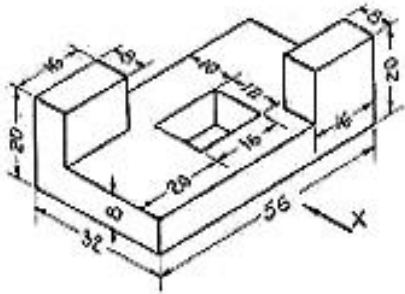
- 7. Draw the projections of a pentagonal prism, base 25mm side and axis 50mm long, resting on one of its rectangular faces on the HP, with the axis inclined at 45° to the VP 14M

**OR**

- 8. Draw the projections of a cone, base 75mm diameter and axis 100mm lying on the HP on one of its generators with the axis parallel to the VP 14M

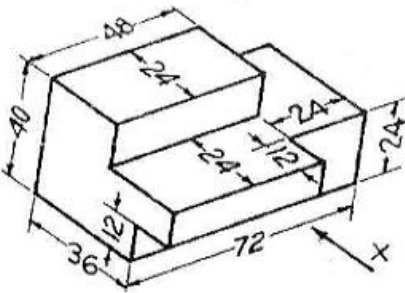
**UNIT-V**

- 9. Draw the front view, Top view and Side view of the following isometric view



**OR**

- 10. Draw the front view, Top view and Side view of the following isometric view



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Code: 7GC14

I B.Tech. I Semester Supplementary Examinations August 2021

**Engineering Mathematics-I**

( Common to All Branches )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit ( 5x14 = 70 Marks )

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**UNIT-I**

1. a) Find the solutions of the system of equations:  $x+2y-z=0$ ,  $2x+y+z=0$ ,  $x-4y+5z=0$  7M
- b) Prove that if  $\lambda$  is an eigen value of a non-singular matrix A corresponding to the eigen vector X then  $\lambda^{-1}$  is an eigen value of  $A^{-1}$  and corresponding eigen vector X itself. 7M

**OR**

2. a) Solve the equations  $x+2y+3z=0$ ,  $3x+4y+4z=0$ ,  $7x+10y+12z=0$  7M
- b) Find the eigen values and eigen vectors of  $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$  7M

**UNIT-II**

3. a) Define a modal matrix, Diagonalize the Matrix  $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$  7M
- b) Show that  $A = \begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$  is a skew-Hermitian matrix and also unitary matrix 7M

**OR**

4. Reduce the quadratic form  $-3x_1^2 - 3x_2^2 - 3x_3^2 - 2x_1x_2 - 2x_1x_3 + 2x_2x_3$  to the canonical form. Find Index and Signature. 14M

**UNIT-III**

5. a) Solve  $(1 + y^2) + (x - e^{\tan^{-1}y}) \frac{dy}{dx} = 0$  7M
- b) If 30% of a radioactive substance disappears in 10 days, how long will it take for 90% of it to disappear? 7M

**OR**

6. a) Solve  $\frac{dy}{dx} + y \tan x = y^2 \sec x$  7M
- b) Find the Orthogonal Trajectories of the family of curves  $x^2 + y^2 = a^2$  7M

**UNIT-IV**

7. a) Solve  $(D^2 + 1)y = \sin x \sin 2x + e^x x^2$  7M
- b) Solve  $\frac{d^2y}{dx^2} + y = \cos ec x$  by the method of variation of parameters. 7M

**OR**

8. a) Solve by the method of variation of parameters  $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = e^x \sin x$  7M
- b) Solve  $(D+2)(D-1)^2 y = e^{-2x} + 2 \sinh x$  7M

**UNIT-V**

9. a) If  $x = r \sin \theta \cos \phi$ ,  $y = r \sin \theta \sin \phi$ ,  $z = r \cos \theta$ , Show that  $\frac{\partial(x, y, z)}{\partial(r, \theta, \phi)} = r^2 \sin \theta$  7M
- b) Find the maxima and minima of  $z = x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$  7M

**OR**

10. A rectangular box open at the top is to have volume of 32 cubic ft. find the dimensions of the box requiring least material for its construction. 14M

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**R-17**

**Code: 7GC12**

I B.Tech. I Semester Supplementary Examinations August 2021

**Engineering Chemistry**  
( Common to CE, ME & CSE )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit ( 5x14 = 70 Marks )

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**UNIT-I**

1. a) Write short notes on  
i) Scale and sludge  
ii) Caustic embrittlement 7M
- b) Discuss in brief the boiler corrosion. How is it controlled? 7M

**OR**

2. What are ionic exchange resins? Explain the ion-exchange method of softening water. Write reactions involved. Discuss the advantages of this method 14M

**UNIT-II**

3. a) What is the principle underlying conductometric titration? Discuss the titration curve obtained for a titration between HCl and NaOH. 7M
- b) Explain the construction and working of H<sub>2</sub>-O<sub>2</sub> fuel cell with neat sketch and chemical reactions 7M

**OR**

4. a) On what factors does the conductance of a solution depend? How would you proceed to determine the conductivity of a solution? 7M
- b) Explain passivity of metals. How it affects rate of corrosion 7M

**UNIT-III**

5. a) Explain the differences between thermoplastics and thermosetting plastics with examples 7M
- b) Write a brief note on Vulcanization and compounding of rubber 7M

**OR**

6. a) Why silicones are called inorganic polymers? Discuss the synthesis of linear and cross linked silicones. 7M
- b) Describe the preparation, properties and engineering applications of Buna-N rubber 7M

**UNIT-IV**

7. a) Define net and gross calorific values of a fuel. How are they determined experimentally for solid fuels? 7M
- b) A sample of Coal on analysis was found to contain the following. C = 73.0 %, H<sub>2</sub> = 3.2 %, O<sub>2</sub>=7.0 %, S = 1.5 %, N<sub>2</sub> = 2.9 %. Calculate the quantity of air required for complete combustion of 1 kg of this coal 7M

**OR**

8. a) Write a note on synthesis of petrol from Fischer Tropsch's synthesis. 7M
- b) Explain the following 7M  
i) Natural gas ii) Water gas iii) Biogas

**UNIT-V**

9. a) What is the significance of flash & fire point, cloud & pour point of a good lubricant? 7M
- b) Write functions of lubricants 7M

**OR**

10. a) Describe the mechanism of extreme pressure lubrication 5M
- b) Explain the measurement and significance of the following properties of lubricant 9M  
(i) Viscosity (ii) Aniline point (iii) Neutralization Number

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Hall Ticket Number :

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**R-17**

**Code: 7G111**

I B.Tech. I Semester Supplementary Examinations August 2021

**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 )

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**UNIT-I**

1. a) Describe computer hardware and computer software. 7M  
b) Define Algorithm. Write an Algorithm to read 20 numbers and print their sum. 7M

**OR**

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

**UNIT-II**

3. a) Describe structure of C program with suitable example. 7M  
b) Write a program to find out total and average of three subject marks. 7M

**OR**

4. a) What is conditional operator? Write a program to enter two numbers and find the smallest out of them. Use conditional operator. 7M  
b) Explain in detail about C data types. 7M

**UNIT-III**

5. a) With Examples, explain while, do while and for loops 6M  
b) Write a program to find out whether the given number is perfect number or not. 8M

**OR**

6. Write a program to generate prime numbers between 1 and 1000. (use break statement to reduce number of iterations) 14M

**UNIT-IV**

7. a) What is an array? How is one dimensional array declared and initialized? 7M  
b) Write a program to find the sum of all elements in an array. 7M

**OR**

8. a) Discuss all string handling functions in C Language. 7M  
b) Write a program to find whether a given string is palindrome or not. 7M

**UNIT-V**

9. Explain different storage classes with examples 14M

**OR**

10. a) Explain the differences between call by value and call by reference with examples. 8M  
b) What is recursive function? Write a program to find factorial of integer value using recursive function. 6M

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