

Code No.: 40M01

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 I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018**Subject: MATHEMATICS-I

Branch: Common to CE, ME, MINING, EEE, ECE & CSE

Time: 3 hours

Max. Marks: 75

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

1. Define Normal form of a Matrix
2. If the eigen values of a 3X3 square matrix are 2,2,8 then what is the rank of the Matrix?

3. Write the quadratic form corresponding to the Matrix $\begin{bmatrix} 1 & 2 & -3 \\ 2 & 4 & 6 \\ -3 & 6 & 2 \end{bmatrix}$

4. Define Wronskian of two solutions of a linear homogenous differential equation
5. What is the Laplace transform of the function $|t|$?

II. Answer ALL questions of the following**10x2Mark=20 Marks**

1. Find the Rank of the Matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 7 \end{bmatrix}$

2. Define Linear Dependence and Independence of Vectors
3. Define Modal and Spectral Matrices
4. Determine the eigen values of the Matrix $\begin{bmatrix} 5 & 4 \\ 3 & 2 \end{bmatrix}$
5. Define rank, index and signature of a quadratic form
6. Write the procedure to obtain the orthogonal trajectory of a given family of curves.
7. Write the general solution of $(D^2 + D + 1)y = 0$
8. Find the particular integral of $(D + 2)(D - 1)^2y = e^{-2x}$
9. Find the Laplace transform of $\frac{\sin t}{t}$
10. Find the inverse Laplace transform of $\frac{1}{s^2 - 5s + 6}$

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

1. Find for what values of k the system of equations $x + y + z = 1$, $2x + y + 4z = k$, $4x + y + 10z = k^2$ have a solution and solve them completely in each case.

(OR)

2. If $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & a \\ 2 & 1 & b \\ 2 & -2 & c \end{bmatrix}$ is orthogonal, find a, b, c. Also find A^{-1}

3. Verify the Cayley-Hamilton theorem for the following Matrix and hence find its inverse

$$A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$

(OR)

4. Find the Matrix P which transforms the Matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ to the diagonal form. Hence calculate A^4

5. If the air is maintained at 30°C and the temperature of the body cools from 80°C to 60°C in 12 minutes, find the temperature of the body after 24 minutes from the original.

(OR)

6. 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 would be the value of N after 2 hours?

7. Solve $(D^2 + a^2)y = \sec ax$ by the method of variation of parameters

(OR)

8. Solve $(D^2 - 6D + 25)y = e^{2x} + \sin x + x$.

9. Evaluate the following integrals using Laplace transforms (i) $\int_0^\infty te^{-3t} \sin t dt$ (5 M)

$$(ii) \int_0^\infty \frac{e^{-t} \sin t}{t} dt \quad (5 M)$$

(OR)

10 Apply the convolution theorem to evaluate the inverse Laplace transform of $\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}$

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018Subject: Computer ProgrammingBranch: **Common to CE & CSE**

Time: 3 hours

Max. Marks: 75

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

1. Write any four data types.
2. What is an array?
3. What is meant by Formal Parameters?
4. Define Pointers.
5. Write four flavours of LINUX.

II. Answer ALL questions of the following**10x2Mark=20 Marks**

1. Define Algorithm.
2. What are different symbols used in flow chart?
3. Write about break and continue statement.
4. Write Syntax of Do- While Loop.
5. Differentiate between Structure and Union.
6. Explain about 'static' storage class.
7. Explain about self-referential structure.
8. Explain about malloc function with a suitable example.
9. Write a Shell Script for wishing the user according to login time.
10. Write features of PHP.

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

1. a) What are the functions of Operating Systems.
b) What are the arguments and their types in the scanf function to read three integers?
(OR)
2. a). What are different Operators in 'C' ?
b). Convert Decimal 78 to Binary Number.
3. Write a C program to multiply two dimensional matrices with output.
(OR)
4. What is a recursion? Write a C program to print the Fibonacci series using recursion.

5. Write a C Program for students report using structures.

(OR)

6. Explain different storage classes with an example.

7. What are command line arguments? Explain them in detail.

(OR)

8. a). What is a file? What are different modes of opening a file?

b). Write a C program to copy the contents of a file to another file.

9. Develop a sample website for college using PHP.

(OR)

10. a). What is a shell and what are the responsibilities of the shell?

b). Explain Open Standards Model.

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- 1) What is unit cell and primitive cell?
- 2) What do you understand by critical damping?
- 3) What are the failures of classical free electron theory?
- 4) How the Fermi level lie in case of intrinsic semiconductor?
- 5) What is the curl of a vector field?

II. Answer ALL questions of the following**10x2Mark=20 Marks**

- 1) Is unit cell of FCC lattice a primitive or not? Why?
- 2) Define space lattice, Basis, Crystal structure.
- 3) Define simple harmonic motion. Write the conditions for SHM.
- 4) Deduce the conditions for resonance of vibrating body.
- 5) Compare the terms wave and particle.
- 6) Show that the wavelength ' λ ' associated with an electron of mass ' m ' and kinetic energy ' E ' is given by $\lambda = \frac{h}{\sqrt{2mE}}$.
- 7) Describe the operation of p-n junction diode in reverse bias.
- 8) Distinguish between n-type and p-type semiconductors.
- 9) State Ampere's critical law.
- 10) What do you understand the gradient of a scalar field.

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

- 1) A) What are Miller indices? Determine the expression for inter planar distance interms of Miller indices.
B) What is Burger's vector? In what direction do the Burger's vector lie with to (i) An edge dislocation (ii) Screw dislocation. (6+4)
- (OR)
- 2) A) What are lattice planes of a crystal? How are they represented?
B) Sketch the following planes of the cubic unit cell : (1 0 0), (1 1 1).
C) How are crystal defects are classified? Explain. (2+2+6)
- 3) A) Derive differential wave equation for SHM and find it's solution.
B) Explain theory of damped oscillations qualitatively. (5+5)
- (OR)
- 4) A) Derive the differential equation for damped oscillator and solve it SHM.
B) Draw the displacement, velocity and acceleration graphs in SHM. (5+5)

- 5) A) Explain the Bloch theorem. (4+6)
B) Describe the experiment verification of matter waves using Davisson – Germer’s experiment.
(OR)
- 6) A) Show that Kroning – Penny model leads to energy band structure in solids.
B) What is a wave function? Explain the physical significance of wave function φ . (5+5)
- 7) A) Derive an expression for the density of holes in valance band in intrinsic semiconductor.
B) Calculate the intrinsic concentration for Ge at 27⁰C. (for Ge, atomic weight = 72.6, density = 5400 Kg/m³, bandgap = 0.7 eV)
C) Write an expression for electrical conductivity of metals (6+2+2)
(OR)
- 8) A) What is Hall effect? Derive an expression for Hall coefficient for n-type semiconductor.
B) Explain the terms (i) Zener breakdown and (ii) Avalanche breakdown. (6+4)
- 9) A) Write Maxwell’s equation in integral form and explain the significance.
B) State and explain Amphere’s law? What are the applications of Amphere’s law. (5+5)
(OR)
- 10) A) Define (i) line integral (ii) surface integral (iii) volume integral.
B) Explain the terms divergence and gradient.
C) Explain the concept of displacement current. (3+3+4)

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, JANUARY-2019Subject: **ENGINEERING DRAWING - I**Branch: **Common to CE, ME, EEE & CSE**Time: **3 hours**Max. Marks: **75**Answer **ALL** questions of the following**5x15Marks= 50Marks**

- 1) A shot is discharged from the ground level at an angle of 60° to the horizontal. The shot returns to the ground, assumed to be horizontal, at a point 80 meters away from the point of discharge. Draw the path traced by the shot. Also draw the normal at any point on the curve. Name the curve. And find the maximum height reached by the shot.

(OR)

- 2) A circle of 50mm diameter rolls on a horizontal line. Draw the curve traced out by a point P on the circumference for one half revolution of the circle. For the remaining half revolution, the circle rolls on a line inclined at 60° to the horizontal line. The point P is vertically above the center of the circle in the starting position.

- 3) A line AB, 90mm long, is inclined at 45° to the HP and its top view makes an angle of 60° with the VP. The end A is in the HP & 12mm in front of the VP. Draw its front view & find its true inclination with the VP. Also locate its traces.

(OR)

- 4) A line AB 120 mm long is inclined at 45° to HP and 30° to VP. Its midpoint M is in VP and 20 mm above HP. The end A is in 3rd quadrant and B in 1st quadrant. Draw its projections.

- 5) Draw the projections of a regular pentagon 40 mm side having its surface inclined at 30° to VP and a side parallel to VP and inclined at an angle of 60° with HP.

(OR)

- 6) A semi-circular plate of 80 mm diameter has its straight edge in the VP and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections.

7) A hexagonal pyramid of base 30 and axis 60 long has its axis is parallel to and 50 above H.P. its base is parallel to the V.P. and an edge of the base is inclined at 45° to the H.P. Draw its projections.

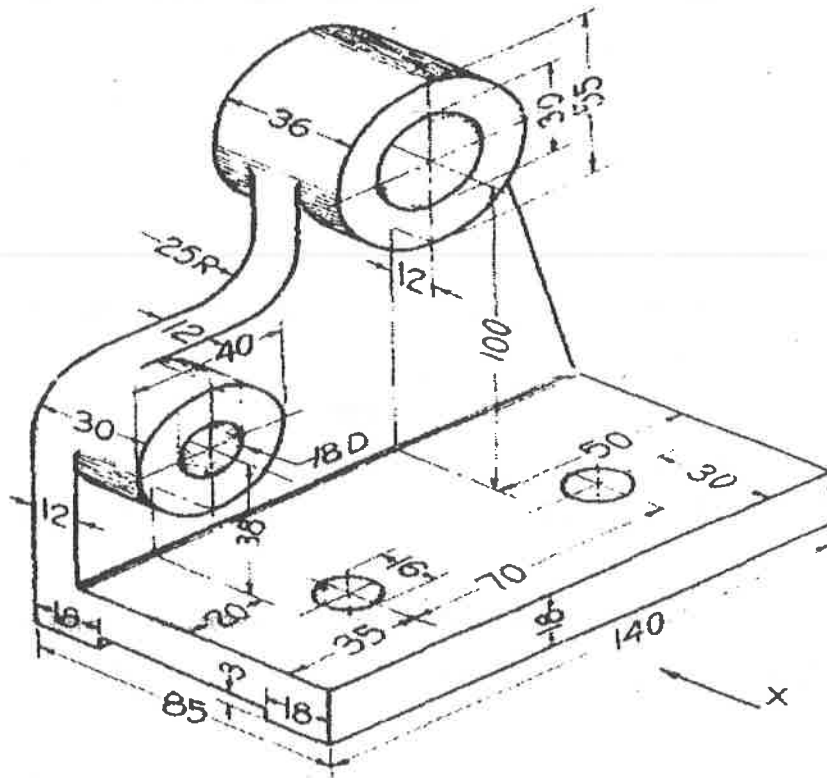
(OR)

8) A pentagonal prism of base 30 side and axis 70 long has its axis inclined at 30° V.P. An edge of its base is in V.P. and inclined at 45° to the H.P. Draw its projections.

9) The frustum of a cone with a 60mm base diameter, 40mm top diameter and 50mm height is surmounted centrally over a cylindrical block with an 80mm diameter and 30mm thickness. Draw its isometric projection.

(OR)

10) Draw
(i) Top View
(ii) Front View &
(iii) Right Side View of the object shown in the fig. below.



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Branch: CSE & ME

Time: 3 hours

Max. Marks: 75

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

1. Why buffer is used in the determination of hardness of water by EDTA method.
2. Chlorine is a good disinfectant and sterilizing agent? Explain how it?
3. Define standard electrode potential?
4. Explain why galvanized utensils are not used for storing food stuffs?
5. Define a lubricant?

II. Answer ALL questions of the following**10x2Mark=20 Marks**

1. Define temporary and permanent hardness of water.
2. Explain why hard water is not fed into boilers.
3. What is break-point chlorination?
4. What is the principle of reverse osmosis?
5. Define primary and secondary battery with examples.
6. What are the advantages of a fuel cell?
7. What is dry corrosion?
8. Explain water line corrosion.
9. Define nanomaterials?
10. What is thermal spalling and how does it affect the stability of refractory bricks.

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

1. a) What are boiler troubles and explain how to minimize these troubles. **6M**
b) Write notes on caustic embrittlement. **4M**
- OR**
2. a) Write notes on phosphate and calgon conditioning of water. **6M**
b) A water sample contains $Mg(HCO_3)_2 = 29.2 \text{ mg/L}$, $Ca(HCO_3)_2 = 32.4 \text{ mg/L}$, $MgCl_2 = 30 \text{ mg/L}$ and $CaSO_4 = 13.5 \text{ mg/L}$. Calculate the permanent and total hardness. **4M**

3. a) Explain with a neat sketch, cold lime soda process of softening of water. **4M**
b) Write notes on desalination of saline water using electro-dialysis technique. **6M**

OR

4. a) Calculate the amount of lime and soda needed for softening of 30,000 liters of water containing the following salts; $\text{CaCO}_3 = 10.0 \text{ mg/L}$; $\text{MgCO}_3 = 8.4 \text{ mg/L}$; $\text{CaCl}_2 = 11.1 \text{ mg/L}$; $\text{MgSO}_4 = 6.0 \text{ mg/L}$; $\text{SiO}_2 = 1.2 \text{ mg/L}$. Assuming the purity of lime as 90% and soda 95%. **5M**
b) Write a note on sterilization and disinfection of water **5M**

5. a) Explain the working of glass electrode with neat sketches. **5M**
b) Write notes on concentration cells. **5M**

OR

6. a) What is electrochemical series? Explain its uses. **6M**
b) Explain the construction and working of dry battery. **4M**

7. a) Write notes on i) Galvanizing ii) Metal Cladding **6M**
b) Discuss differential aeration corrosion. **4M**

OR

8. a) Explain wet theory of corrosion with neat sketches. **6M**
b) Discuss electroless plating methods for protection of metal from corrosion. **4M**

9. a) Explain sol-gel method for preparation of nanoparticles. **6M**
b) How are refractories classified? Give one example each for the different classes. **4M**

OR

10. a) Explain the mechanism of thin film lubrication. **5M**
b) Explain preparation of CNTs by chemical vapour deposition method. **5M**