Code No.: **40P01** | **MR14**

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, MAY-2018

Subject: **Engineering Physics**

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

Time: 3 hours **Max. Marks: 75**

PART – A

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

1) What are the lattice parameters?
2) What is sharpness of resonance?
3) What is wave function?
4) Distinguish between intrinsic and extrinsic semiconductors.
5) Define electromagnetic field

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

1) Explain the terms relating crystal structure
   (i) Coordination number (ii) Number of atoms per unit cell
2) What is Burger's vector? Explain it.
3) Why are the forced oscillations of a damped oscillator are not damped?
4) The maximum velocity of a body in SHM is 100 m/s while the maximum acceleration is 1.57 m/s^2. Calculate the time period of a body.
5) State and explain Heisenberg uncertinity principle.
6) Distinguish between insulator, semiconductor and conductor on the basis of band theory of solids.
7) What is direct bandgap semiconductor?
8) Draw the energy band diagram of (i) An intrinsic (ii) n-type and (iii) p-type semiconductor include Fermi, donor and acceptor levels, wherever present.
9) What is Lenz's law?
10) Define curl a vector. Write its determinant form.

PART-B

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

1) a) Define packing fraction of crystal structure. Calculate the packing fraction of FCC crystal.
   b) Explain Schottky and Frenkel defects qualitatively. (5+5)

(OR)

2) a) Describe the seven crystal structures with neat diagrams.
   b) Explain the type of defects in metallic lattice (i) Vacancy (ii) Interstitial defects. (5+5)

3) a) Explain the function of all electrical oscillator containing capacitor, inductor and resistor.
   b) Explain forced oscillations qualitatively. (6+4)

(OR)

4) a) What is simple harmonic oscillations? Derive differential wave equations for SHM and find it's significance.
   b) What is meant by over damped & critical damped oscillations? Explain them briefly. (6+4)

5) a) Derive an expression for electrical conductivity on the basis of classical free electron theory.
b) What is Bloch theorem? Explain. (6+4)

(OR)

6) a) Derive Schrodinger time independent wave equation.
b) What are the important conclusions of G.P. Thomson experiment?
c) Calculate the velocity of an electron having wavelength of 0.21 nm. (5+3+2)

7) a) Estimate the carrier concentration in n-type semiconductor. (5+5)
b) What is Hall effect? Derive an expression for Hall coefficient for n-type semiconductor.

(OR)

8) a) Explain the formation of p-n junction diode and I-V characteristics of p-n junction diode.
b) Explain the concept of Fermi level in intrinsic and extrinsic semiconductors. How it will be change with temperature? (5+5)

9) Describe Maxwell's equation of differential and integral forms. (10)

(OR)

10) a) Define gradient, divergence, curl of a vector. Explain their physical significance.
b) Derive an expression for the electromagnetic wave equation in free space. (5+5)

Code No.: **40C01** **MR14**

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 II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Engineering Chemistry-I**

Branch: **Common to CE, ME & CSE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer all Questions **1x5=5M**

1. Define the units (British thermal unit and Centrigrade unit) of heat and their interconversion.
2. How are exhausted ion-exchange resins regenerated?
3. Draw a neat sketch of a galvanic cell.
4. Define corrosion with one example.
5. Difference between acidic and basic refractories.

II. Answer all Questions **2x10=20M**

1. The presence of CO_2 in boiler feed water should be avoided why?
2. Discuss boiler corrosion.
3. What is sedimentation with coagulation?
4. Define desalination of brackish water?
5. Explain the principle involved in potentiometric titrations with examples.
6. Write the anodic, cathodic and net reactions of Ni-Cd battery.
7. Differentiate galvanizing and tinning.
8. What is meant by electroless deposition?
9. What are refractories?
10. Discuss the classification of lubricants.

PART – B

Answer all Questions **5x10=50M**

1. a) Discuss the formation of scales and sludges in boiler? Explain how they can be removed.

   b) A water sample contains $Ca(HCO_3)_2$ = 35 mg/L, $Mg(HCO_3)_2$ = 26 mg/L, $CaSO_4$ = 13.5 mg/L, $MgSO_4$ = 14 mg/L. Calculate temporary and permanent hardness of water. **6M +4M**

OR

2. a) Discuss the principle of complexometric estimation of hardness of a water sample.

   b) Discuss priming and foaming and how can they be avoided. **6M +4M**

3. a) Explain the softening of water by Permutit process. **5M**

   b) Describe with a neat sketch hot lime soda process. **5M**

OR

4. a) Explain the essential requirements for potable water. **5M**

   b) Calculate the amount of lime (88.3 % pure) and soda (99 % pure) required for softening 24,000 liters of water sample, which contains $CaCO_3$ = 1.85 ppm, $CaSO_4$ = 0.34 ppm, $MgSO_4$ = 0.9 ppm, $MgCO_3$ = 0.42 ppm, $MgCl_2$ = 0.76 ppm, NaCl = 2.34 ppm. **5M**

5. a) Explain the construction, working principle and applications of lead storage battery. **6M**

   b) Derive Nernst equation for single electrode potential. **4M**

OR

6. a) Discuss the construction and working of calomel electrode. **5M**

   b) What are fuel cells? Discuss the construction of H_2-O_2 fuel cell. **5M**

7. a) Explain the factors affecting the rate of corrosion. **5M**

   b) Write notes on i) Bimetallic corrosion ii) Pitting corrosion. **5M**

OR

8. a) What is cathodic protection? Explain with examples how cathodic protection can be used to protect iron. **6M**

   b) Write notes on electroplating. **4M**

9. a) Explain the mechanism of hydrodynamic lubrication. **6M**

   b) Write the applications of carbon nanotubes. **4M**

OR

10. a) Explain the pyrometric cone test and RUL test for the determination of refractoriness. **5M**

    b) Write notes on i) Viscosity ii) Flash and fire point **5M**

Code No.: **40M01** | **MR14**

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, MAY-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 Rank of a Matrix
2. State the Cayley-Hamilton theorem
3. Write the matrix of the quadratic form $2x^2 + 3y^2 - z^2 + 3xy - 2yz$
4. Write the equation $y^{11} - 2y = e^x$ in the operator form
5. Define the Laplace transform of a function

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

1. Find the inverse of the Matrix $\begin{bmatrix} 3 & 4 \\ 1 & 2 \end{bmatrix}$ Using elementary transformations
2. Write the conditions for consistency of a system of Non-Homogenous linear equations
3. Write any two properties of eigen values and eigen vectors
4. Define Hermitian and Unitary Matrices
5. Define Positive Definite and Negative Definite Quadratic forms
6. Write any two applications of Linear Differential equations of first order.
7. Solve $(D^2 + 6D + 9)y = 0$
8. Find the particular integral of $(D^3+D)y = \sin x$
9. Find the Laplace Transform of $\sin^3 t$
10. Find the inverse Laplace transform of $\frac{s^2 - 3s + 4}{s^3}$

PART-B

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

1. Determine the values of k for which the following system of equations has non-trivial solutions and find them

$(k-1)x + (4k-2)y + (k+3)z = 0$; $(k-1)x + (3k+1)y + 2kz = 0$; $2x + (3k+1)y + 3(k-1)z = 0$;

(OR)

2. Solve the system of equations $3x + y + 2z = 3$, $2x - 3y - z = 3$, $x + 2y + z = 4$ by LU decomposition method

3. Find the eigen values and eigen vectors of the Matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

(OR)

4. Prove that the Matrix $\frac{1}{2}\begin{bmatrix} 1+i & -1+i \\ 1+i & 1-i \end{bmatrix}$ is unitary and find it's inverse.

5. Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to canonical form and specify the matrix of transformation

(OR)

6. Find the orthogonal trajectories of the family of confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1, \lambda$ being the parameter

7. Solve $(D^2-1)y = x\sin 3x + \cos x$

(OR)

8. Solve $(D^2-2D+1)y = xe^x \sin x$

9. Find the inverse Laplace transform of $\frac{s}{s^4+4a^4}$

(OR)

10 Solve the following differential equation using Laplace transforms

$$y^{11} + 2y^1 - 3y = \sin t, y(0) = y^1(0) = 0$$

Code No.: **40501** **MR14**

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, MAY-2018

Subject: **Computer Programming**

Branch: **Common to CE, ME, MINING & CSE**

Time: 3 hours **Max. Marks: 75**

PART – A

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

1. What is the purpose of an operating system?
2. Name any two library functions used for string handling.
3. What is the need for functions?
4. What do you mean by binary file?
5. Give an example of open source software

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

1. What are various types of operators?
2. What do you mean by type conversion?
3. What is the difference between array and pointer?
4. Mention the various string manipulation functions in C.
5. Write a C Program to print the first 50 prime numbers recursively
6. Define function and list the types of functions.
7. Write any two pre-processor directives in C.
8. What is an address operator and indirection operator?
9. What is the common usage of PHP?
10. What are the different types of PHP variables?

PART-B

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

1. a)Draw the flow chart for finding a biggest number from three numbers **[5M+5M]**

   b) Write an algorithm for find whether the given number is even or odd

OR

2. Convert the decimal number 251.75 into binary, octal and hexadecimal equivalent **[10M]**

3. a)What is an array? Explain the declaration and initialization of one and two dimensional arrays **[5M+5M]**

b) Explain with example switch and for statements.

OR

4.a) What are string I/O functions? Write a C program to reverse a String by passing it to function **[5M+5M]**

b) What is loop? Explain break, continue, goto statements with examples

5. a)What is recursion? Explain a recursive function with suitable example **[5M+5M]**

b) What is union? Discuss with an example of C program

OR

6. What is a function in C? Discuss about call by value and call by reference with illustrations **[10M]**

7. a)Write in detail about pointer arithmetic **[5M+5M]**

b) Discuss about file status functions with examples

OR

8. Explain self referential structures and dynamic memory allocation with suitable examples **[10M]**

9.a)Explain open standards model and its applications **[5M+5M]**

b) What are various basic commands in Linux? Explain shell programming in C

OR

10.a)Explain features and functions of PHP **[5M+5M]**

b) What is shell in Linux? Write a Shell script to check whether a given number is Armstrong

Code No.: **40301** **MR14**

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, JUNE-2018

Subject: **Engineering Drawing**

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

Time: 3 hours **Max. Marks: 75**

Answer ALL Questions of the following **5x15=75M**

1) Show by means of a drawing that when the diameter of the directing circle is twice that of the generating circle the hypocycloid is a straight line. Take the diameter of the generating circle is equal to 50mm.

(OR)

2) Draw a rectangular hyperbola when the position of a point P on the curve is 30mm from the horizontal asymptote and 50mm from the vertical asymptote. Show at least four points on either side of point P.

3) A line AB of 75 long is making an angle of 55^0 with XY line in the front view and length of the top view is 55. End A is 15 above H.P and 10 infront of V.P. Draw the projections of the line and its inclinations with H.P. & V.P.

(OR)

4) The front view of a line AB 90 mm long is inclined at 45^0 to XY line. The front view measures 65 mm long. Point A is located 15 mm above HP and is in VP. Draw the projections and find its true inclinations. Also locate its traces

5) Draw the projections of a pentagonal plane, side 25mm resting on the HP on one of its edges. The plane of the pentagon is inclined at 45^0 to the HP and the perpendicular drawn from the midpoint of the resting edge makes an angle of 30^0 with the VP.

(OR)

6) A rectangular plate of size 70mm X 40mm rests on its shorter side in the V.P. and the surface is inclined at 45^0 with the V.P. the longer side of the plane is inclined at 30^0 to the H.P. Draw its projections.

7) A square pyramid, base 40 mm side and axis 90 mm long, has a triangular face on the ground and the vertical plane containing the axis makes an angle of 45^0 with the VP. Draw its projections.

(OR)

8) A hexagonal prism having a base with a 25mm edge and a 60mm long axis, has an edge of its base in the V.P. and is inclined at 60^0 to the H.P. Draw its projections when the edge of the other base farthest away from the V.P is at a distance of 70mm from the V.P.

9) Draw isometric projection of a frustum of a sphere with a 60mm diameter, frustum circle with a 40mm diameter, resting centrally on a cube with a 50mm side such that the circle of a frustum is horizontal and do not touch the cube.

(OR)

10) Draw (i) Top View

(ii) Front View &

(iii) Right Side View of the object shown in the fig. below.