Code No.:**30M01** **MR13**

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 SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Mathematics-I**

Branch: **CE, ME, EEE, ECE, CSE & IT**

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

PART – A

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

1. Find the eigen value of the matrix $\begin{bmatrix}1 & 1 & 1\\1 & 1 & 1\\1 & 1 & 1\end{bmatrix}$
2. State Lagrange mean value theorem?
3. Find the value of $\beta\left[\frac{1}{2}, \frac{3}{2}\right]$
4. Write the general solution of $y^{11}-4y^{1}+4y=0$?
5. Find the Laplace transform of t sint?

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

1. Find the value of k such that the rank of a matrix $\begin{bmatrix}1 & 2 & 3\\2 & k & 7\\3 & 6 & 10\end{bmatrix}$ is 2.
2. State Cayley-Hamilton theorem.
3. Verify Lagrange's Mean Value Theorem for f(x) = cosx in $[0,\pi/2]$
4. Verify the Rolle's theorem for $f(x)= (x^3+6x^2+6x+8)(x-3)^4$ in [-2,3]?
5. Show that $\beta(m+1,n) = \frac{m}{m+n}\beta(m, n)$
6. Define Beta and Gamma functions?
7. Solve $(x + 1)\frac{dy}{dx} - y = e^{3x}(x + 1)^2$
8. Find the PI of $y^{11}-3y^{1}+2y = \sin 3x$
9. Find the inverse Laplace transform of $\frac{1}{(p-2)(p+3)}$
10. Find the Laplace transform of the function cos (at + b).

PART-B

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

1. Show that the following system of equations is consistent and solve the system by using the Gauss- Jordan method.

   $x_1+x_2+x_3+x_4 = 0$

   $x_1+x_2+x_3-x_4 = 4$

   $x_1+x_2-x_3+ x_4= -4$

   $x_1- x_2+ x_3+ x_4=2$

OR

2. If $A=\begin{bmatrix} 2 & 1 & -3 & -6 \\ 2 & -3 & 1 & 2 \\ 1 & 1 & 1 & 2 \end{bmatrix}$ find non singular matrices P and Q such that PAQ is in the normal form of the matrix and find its rank.

3. If the perimeter of a triangle is constant, Show that the triangle has maximum area when it is an equilateral triangle.

OR

4. a) If $u = x+2y+z$, $v =x-2y+3z$, $w = 2xy -xz+4yz-2z^2$ Show that they are functionally related and find the relation between them.

   b) Verify the Lagrange mean value theorem for the function $f(x) =\log_e x$ in the interval [1,e]

5. Change the order of integration and evaluate $\int_0^{4a}\int_{x^2/4a}^{2\sqrt{ax}} dydx$

OR

6. Change the order of integration and evaluate $\int_0^1\int_0^{\sqrt{1-x^2}} y^2\, dydx$

7. The temperature of the body drops from 100°C to75°C in ten minutes when the surrounding air is at 20°C temperature. What will be its temperature after half an hour? When will the temperature be 25°C?

OR

8. Apply method of variation of parameter to solve $(D^2-1)y = e^{-x} \sin(e^{-x}) + \cos(e^{-x})$.

9. State the convolution theorem. Find the inverse Laplace transform of $\frac{1}{(s^2+a^2)^2}$ by using convolution theorem.

OR

10. a) If $L\{f(t)\} = \bar{f}(s)$ then prove that $L\{\int_0^1 f(u)du\} = \frac{1}{s}\bar{f}(s)$

    b) Evaluate $L\{\frac{cosbt-cosat}{t}\}$

Code No.: **30M02** | **MR13**

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I B.TECH SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Mathematical Methods**

Branch: **ECE & CSE, IT**

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

PART – A

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

1. Write the language interpolating polynomial?
2. Write the fourth order Runge- Kutta method formula.
3. Write the fourier series of f(x) = cosx in $(0,2\pi)$.
4. Solve the partial differential equation $Z= px+qy+c\sqrt{1+p^2+q^2}$
5. Define curl of a vector.

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

1. Prove that $1+\mu^2.\delta^2 = \left(1+\frac{1}{2}\delta^2\right)^2$
2. Prove that $E = e^{hD}$.
3. Derive the Newton-Raphson iterative formula to find $\frac{1}{N}$.
4. Write the geometrical interpretation of the NewtonRaphson's method.
5. Find the Fourier cosine transform of $f(x) = e^{-ax}$ where $a>0$.
6. Obtain the half range sine series for e^x in $o<x<1$.
7. Find complete integral of $pe^y= qe^x$
8. Solve the partial differential equation $p^2+q^2= x+y$.
9. Apply Gauss divergence theorem, prove that $\int r.ds = 3V$.
10. Find the greatest value of the directional derivative of the function $f = x^2yz^3$ at (2,1,-1).

PART-B

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

1. Obtain a relation of the form $y=ab^x$ for the following by the method of least square.

x	2	3	4	5	6
y	8.3	15.4	33.1	65.2	127.4

OR

2. Obtain a relation of the form $y = ax^b$ for the following data by the method of least squares

x	2	3	4	5	6
y	8.3	15.4	33.1	65.2	127.4

3. Solve the following system of equations by using Gauss-seidal method $28x + 4y - z = 32$, $x + 3y + 10z = 24, 2x + 17v + 4z = 35$.

OR

4. Prove that Newton-Raphson method has quadratic convergence and also using this method find a real root of the equation $3x-\cos x-1=0$.

5. If $f(x) = |\cos x|$, expand f(x) as a Fourier series in the interval $(-\pi, \pi)$.

OR

6. Using Parseval's identity prove that $\int_0^\infty \frac{dt}{(a^2+t^2)(b^2+t^2)} = \frac{\pi}{2ab(a+b)}$

7. Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.

OR

8. Form the partial differential equation $f(x + y + z, x^2 + y^2 + z^2)$.

9. Determine whether the line integral $\int (2xyz^2)dx + (x^2z^2 + z\cos yz)dy + (2x^2yz + y\cos yz)dz$ is independent of the path of integration? If so then evaluate it from (1,0,1) to $(0, \frac{\pi}{2}, 1)$.

OR

10. Find the work done by $\bar{F} = (2x - y - z)\bar{\imath} + (x + y - z)\bar{\jmath} + (3x - 2y - 5z)\bar{k}$ along a curve in the xy-plane given by $x^2 + y^2 = 9$, $z = 0$.

Code No.: **30P01** | **MR13**

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I B.TECH SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Physics**

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

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

PART – A

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

1. Define atomic radius, packing fraction and coordination number.
2. Mention types of semiconductors.
3. What is Bottom-Up method of nano material synthesis?
4. What is meta-stable state?
5. What is diffraction?

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

1. Discuss about principle of X-Ray diffraction.
2. Define inter planar spacing. Write the expression of inter planar spacing for cubic crystal.
3. Draw E versus K graph for Kronig-Penny model.
4. Represent Fermi levels in n-type and p-type semiconductors?
5. Explain sol-gel method of fabrication.
6. What are Ferro-electric materials?
7. Discuss about anti-ferro magnetic materials.
8. Give example for 3-state and 4-state lasers.
9. Discuss about optical path difference
10. Define numerical aperture?

PART-B

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

1. a) Define reverberation time. Derive Sabines formula for reverberation time. 6M

   b) What is Simple Harmonic Motion (SHM)? Obtain solution for differential equation representing SHM. 4M

OR

2. a) Explain significance of Burger's vector.

   b) Derive expression for energy of the simple oscillator?

   c) Write a short note on sharpness of resonance? [2+6+2]

3. a) What is Hall effect? Derive the expression for hall coefficient. Write its significance.

   b) Discuss the classification of solids into conductors, insulators and semiconductors.

OR

4. a) Derive charge carrier concentration in intrinsic semiconductors

   b) Represent Fermi levels? [8+2]

5. a) Derive expressions for electronic and iconic polarizations?

   b) Discuss about internal fields in solids qualitatively?

OR

6. a) Explain about nano and bulk materials. [4+6M]

   b) Write a short note on sol-gel process and chemical vapour deposition.

7. a) Distinguish between Ordinary and Laser light? [4+6M]

   b) What are Einstein's A and B coefficients? And obtain relation between them?

OR

8. a) What is BhorMagneton? Deduce an expression for Bhormagneton. [5M]

   b) Explain the concept of perfect diamagnetism? [5M]

9. a) Describe the principle of an optical fiber and construction of optical fibers?

   b) Discuss about Netwon's rings experiment and deduce the equation for the calculation of wavelength of given source.

OR

10. a) Discuss step index and graded index fibers with neat diagrams. 6M

    b) Calculate Numerical and acceptance angle of silica fiber whose refractive indices of core and clad are 1.49 and 1.45 respectively. 4M

Code No.: **30C01** **MR13**

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I B.TECH SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Chemistry**

Branch: **Common to CE, MINING, ECE, CSE & IT**

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

PART – A

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

1. A pure metal half immersed vertically in water starts corroding at the bottom. Give reasons.
2. What is caustic embrittlement?
3. Why teflon is extremely tough in nature?
4. Why a good fuel should possess low ash content?
5. What is meant by adsorption isotherm?

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

1. How do you represent quinhydrone electrode schematically?
2. Give any two examples of secondary cells.
3. What is break point chlorination?
4. What do you mean by Scale and Sludge?
5. How Nylon-6, 6 is produced?
6. Define flash and fire points? Write the significance of flash and fire points
7. Explain Dulong's formula.
8. Distinguish between HCV and LCV.
9. At the triple point, the system is invariant. Justify this statement.
10. What is Tyndall effect?

PART-B

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

1) a) Differentiate primary and secondary batteries.
   b) What are fuel cells? Explain the working of hydrogen oxygen fuel cell and its advantages.

(OR)

2) a) What is paint. Explain the different constituents of paints and their functions with suitable examples.
   b) By making use of glass electrode how do you determine the P^H of a solution?

3) a) Explain the internal treatments of boiler feed water.
   b) How hard water is softened by Zeolite process.

(OR)

4) a) Write a short note on reverse osmosis.
   b) Briefly describe the steps involved in the treatment of potable water.

5) a) How the Bakelite is synthesized.
b) Explain the process of vulcanization of natural rubber with relevant chemical reactions.

(OR)

6) a) What are refractories. Classify them?
b) Distinguish between thick film and thin film lubrication.

7) a) Explain the ultimate analysis of coal and its significance.
b) Explain the analysis of flue gases by Orsat's apparatus.

(OR)

8) a) What is cracking? Explain Fischer – Tropsch method of synthesis of petrol.
b) Explain the determination of calorific values by Junker's gas calorimeter.

9) a) State the phase rule and explain the terms involved with suitable examples.
b) Draw a neat phase diagram of water system and explain the curves, areas and point with reference to phase rule.

(OR)

10) a) What are colloids? How are they classified?
b) Derive Langmuir adsorption isotherm.

Code No.: **30501** **MR13**

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I B.TECH SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Computer Programming**

Branch: **ME**

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

PART – A

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

1. Define flowchart?.
2. Define function ?
3. What is an array?
4. What is Union?
5. What is mean by linked list? What are the advantages and disadvantages in using linked list?

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

1. Write the various steps involved in executing a C program and illustrate with the help of flow chart?
2. Name the different data types that C supports and explain them in detail.
3. What do you mean by functions? Give the structure of the functions and explain about the arguments and their return values?
4. Write a C program that uses a function to sort an array of integers.
5. Explain the process of accessing a variable through its pointer. Give an Example.
6. Explain the effects of the following statements.
   (i) int a, *b=&a;
   (ii) int p, *p;
   (iii) char *s;
   (iv) A=(float*)&X;
7. Differentiate between a structure and union?
8. What are the different input output operations on Files?
9. What do you mean by Searching? Mention the different types of Searching.
10. Explain the applications of Stack.

PART-B

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

1. What are the different types of control statements available 'C'. Explain them with an example?

OR

2. Write a program to generate Fibonacci series using recursion.

3. (a) Write short notes on auto and static storage classes.
   (b) Write short notes on call by reference .

OR

4. Define an array. What are the different types of arrays. Explain.

5. What are the various operations performed in pointers explain with an example?

OR

6. Explain about String manipulation functions?

7. Define Structure and write the general format for declaring and accessing members.

OR

8. What is the purpose of library function feof() ? How feof() be utilized within a program that updates an unformatted data file. Explain.

9. Trace through the steps by hand to sort the following list in quick sort.

   28 7 39 3 63 13 61 17 50 21

OR

10. What are the advantages and disadvantages of stack ? Write a program to illustrate stack operation ?

Code No.: **30302** | **MR13**

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I B.TECH SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Drawing**

Branch: **Common to ME, MINING, ECE, CSE & IT**

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

Answer ALL questions of the following **5x15 Marks= 75Marks**

1. a) Construct a scale of 1/60 to read meters and decimeters and long enough to measure up to 6m. Mark on it a distance of 5.4m. (6M+9M)
   b) Construct a hyperbola, with the distance between the focus and the directrix is 50 and eccentricity as 3/2. Also, draw normal and tangent to the curve at a point 30 from the directrix.

OR

2. Draw a hypocycloid of a circle of diameter 50mm, which rolls inside a circle of diameter 180mm for one revolution. Also draw a tangent and a normal to the hypocycloid at a point 50mm from the centre of the directing circle.

3. Two points P and Q are in H.P. The point P is 30 in front of V.P and Q is behind the V.P. The distance between their projectors is 80 and line joining their top views makes an angle of 40° with xy. Find the distance of the point Q from the V.P.

OR

4. A Circular lamina of 60mm diameter is resting on a point of its circumference on the VP. The center is 40mm above HP and the surface is inclined at 45^0 to the VP and perpendicular to the HP. Draw the projections.

5. Draw the projections of a pentagonal pyramid, axis 60 long, base 30 side, having base on the ground and one of its edges of the base inclined at 45° to V.P.

OR

6. A right circular cone of base diameter 50 mm and altitude 50 mm stands with its base on HP. A Vertical section plane inclined at 45° to VP cuts the cone at 10 mm from the axis. Determine the apparent and true shapes of the sections.

7. A cone of base 50 diameter and axis 60 mm long, is resting on its base on H.P.It is cut by a section plane perpendicular to V.P and parallel to an extreme generator and passing through a point on the axis at a distance of 20 mm from the apex. Draw the development of the retained solid.

OR

8. Draw a perspective view of a square plane of side 50mm resting on the GP with one of its corners touching PP and a side right to the corner inclined at 60° to it. The station point is 70mm in front of PP, 65mm above GP and lies in a CP which is 35mm towards right of the corner touching the PP.

9. Draw the isometric projection of:

   i) a rectangle of 80 and 50 sides its plane being horizontal. [7M]

   ii)a regular pentagon of 25 side its plane being vertical and one of its sides horizontal.[8M]

OR

10. Draw the following views of the object given in figure below. All dimensions are in mm.

    i) Front view ii) Top view iii) Right side view