Code No.: **70B06** | **MR17**

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: **Engineering Physics**

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

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Define interference .
2. Define Simple Harmonic Motion
3. Draw crystal planes having miller indices (111) and (101).
4. Write the properties of wave function.
5. Mention any two properties of carbon nano tubes

PART-B

Answer ALL questions of the following **5x 10 Marks= 50Marks**

1. a) Which is fringe width
   b) Obtain the expression for the resolving power of a grating.
   c) The sodium Yellow doublet has wavelengths 5890Å and 5896Å. What should be the resolving power of a grating to resolve these lines? (2+6+2)

(OR)

2. a). explain one application of interference in thin films (2)
   b). Show that the diameters of the bright rings in Newton's rings experiment are, proportional to the square root of odd natural numbers. (8)
3. a) What is a damped harmonic oscillator?
   b) Obtain the solution for the differential equation of a damped harmonic oscillator.
   c) Discuss the critical, over and underdamped conditions of the oscillator. (1+3+6)

(OR)

4. a). Draw neat sketch of Lissajous figures with same frequency of SHM (6)
   b). What is resonance? explain resonance frequency .
5. a). Explain the X -ray powder diffraction method to determine crystal structure. (6)
   b). Estimate packing fraction for SC, BCC and FCC structures. (4)

(OR)

6. (a) Define Miller indices. Determine Miller indices for a plane making 2a, 4b, 3c intercepts on the crystallographic axes. [4]
   (b) Show that FCC is closely packed over SC and BCC crystal structures (6)
7. a) Derive Schrodinger's time independent wave equation
   b) Apply the above equation for a particle in one dimensional infinite potential well and discuss its wavefunctions and energy levels (4+6)

(OR)

8. a). Explain the properties of matter waves. (3)
   b).What is normalization of wave function
   c) A quantum particle confined to one dimensional box of a width a is known to be in its first exited states . determine the probability of the particle in the central half .
9. a) What is nano technology
   b) What are the different methods of synthesis of nanomaterials? (2+8)

(OR)

10. a. Explain any technique for the synthesis of nanomaterial (7)
    b. Describe CVD (Chemical vapor deposition) technique for the synthesis of nanometerials (4)

Code No.: **70B01** | **MR17**

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Engineering Mathematics**

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

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Find the rank of the matrix $A = \begin{bmatrix} 0 & 1 & 2 & 2 \\ 1 & 1 & 2 & 3 \\ 3 & 4 & 8 & 11 \\ 1 & 3 & 6 & 7 \end{bmatrix}$.
2. If λ be an eigen value of a non-singular matrix A corresponding to eigen vector X, then prove that λ^{-1} is eign value of A^{-1} corresponding to the eigen vector X.
3. Solve the differential equation $(x^2 - y^2)dx = 2xy\,dy$
4. Solve : $y'' - 6y' + 9y = 0$
5. Using Laplace transform evaluate $\int_0^\infty te^{-3t} \sin t dt$

PART-B

Answer ALL questions of the following **5x 10 Marks= 50Marks**

1. (a) Find the non- singular matrices P and Q such that the normal form of A is PAQ where $A = \begin{pmatrix} 1 & 3 & 6 & -1 \\ 1 & 4 & 5 & 1 \\ 1 & 5 & 4 & 3 \end{pmatrix}$.Hence find its rank. [4+2+4]

   (b) Define linearly dependent and linearly independent set of vectors.

   (c) Show that the only real number k

   X+2y+3z= kx, 3x+y+2z = ky, 2x+3y+z = kz

   has non-zero solution is 6 and solve them, when k =6

OR

2. a) Reduce the matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \\ 3 & 0 & 5 & -10 \end{bmatrix}$ into the normal form and hence find its rank.

   b) Find inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ by elementary transformations.

3. Show that the matrix $\frac{1}{2}\begin{bmatrix} \sqrt{2} & -i\sqrt{2} & 0 \\ i\sqrt{2} & -\sqrt{2} & 0 \\ 0 & 0 & 2 \end{bmatrix}$ Uinitary and hence findA^{-1}.

OR

4. Show that the matrix $\begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$ is Skew-Hermitian and unitary also find the Eigen values and Eigen vectors.

5. (a) Solve the differential equation $(x+1)\frac{dy}{dx} - y = e^{3x}(x+1)^2$ **[5+5]**

   (b) The temperature of cup of coffee is 92^0 C, when freshly poured the room temperature being 24^0 C. In one minute it was cooled to 80^0 C. how long a period must elapse, before the temperature of the cup becomes 65^0 C.

OR

6. Reduce the quadratic form $x^2 + y^2 + z^2$ -2xy + 2yz in to canonical form by non singular linear transform and hence find its rank, index, signature and nature.

7. (a)Solve the differential equation $(D^2 - 4D + 4) = e^{2x} + \sin 3x$ **[5+5]**

   (b) Solve the differential equation $(2x+3)^2 \frac{d^2y}{dx^2} - (2x+3)\frac{dy}{dx} - 12y = 6x$

OR

8. a) Solve the differential equation $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = e^{-2x}\sin 2x$

   b) Solve $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\{\log(1+x)\}$

9. a) Evaluate $\int_0^\infty e^{-t}\left(\frac{\cos at - \cos bt}{t}\right)dt$

   b) Find the inverse Laplace transform of $\frac{2s-3}{s^2+4s+13}$

OR

10. a) Find inverse laplace transform of $\left[\frac{x^2}{(x+1)(x+2)(x+3)}\right]$

    b) Find inverse laplace transform of $\cot^{-1}(s)$.

Code No.: **70501** **MR17**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Computer Programming**

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

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Define Software and Translator?
2. What is the difference between while and do-while loops?
3. Write the syntax of malloc ().
4. Define function in C?
5. Define searching? Write the differences between linear search and binary search.

PART-B

Answer ALL questions of the following **5x 10 Marks= 50Marks**

1. a) Explain the following with suitable example [6M]
   i. Flow Chart
   ii. Algorithm
   b) Explain the Variables, Constants, and Type Qualifiers in C Language. [4M]

(OR)

2. a) What is an algorithm? Write an algorithm for printing Fibonacci series. [5M]
   b) Write about different data types in C. [5M]
3. a) Write a C program to multiply given two matrices. [5M]
   b) What are different conditional statements in C [5M]

(OR)

4. A) What is array? Explain different types of arrays in C. [5M]
   B) Write a C program to display transpose of a given matrix. [5M]
5. a) Explain following String manipulation functions
   i)strcmp() ii)strupr()

(OR)

6. a) Discuss about any four string I/O functions in C. [5M]
   b) Write a c program to check weather given string is palindrome or not [5M]
7. a) Write a c program to check weather a given number is Armstrong using function ?
   b) How to pass pointer variables as function arguments? Explain with examples. [5M]

(OR)

8. What are the different types of functions? Explain any 5 library functions with suitable examples [10M]
9. a) How the Command Line Arguments can be passed? Explain with suitable Example C Programs. [5M]
   b) How to handle errors in File Management? Explain it. [5M]

(OR)

10. What are different modes used for file operations? Write a C program to read and display text from a file. [10M]

Code No.: **70B10** | **MR17**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Applied Chemistry**

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

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Why does hard water consume lot of soap?
2. Impure metal corrodes faster than pure metal under identical conditions. Give reason.
3. Why does natural rubber need compounding?
4. What is mean by ignition temperature?
5. Give two examples of natural composite materials.

PART-B

Answer ALL questions of the following **5x 10 Marks= 50Marks**

1. a) What is the principle of EDTA titration? Briefly explain the estimation of hardness of water by EDTA method.
   b) Calculate the total hardness of water containing 16.8 mg/L of $Mg(HCO_3)_2$, 19.0 mg/L of $MgCl_2$, 24.0 mg/L of $MgSO_4$ and 22.2 mg/L of $CaCl_2$

(OR)

2. What is hardness of water? How do you express hardness? Give its various units & their inter conversions.
3. a) Write Nernst equation. Explain all the terms in it.
   b) Write the construction & reactions of Ni-Cd cell.

(OR)

4. Explain Dry (chemical) theory of corrosion in detail.
5. a) What are fibre-reinforced polymers? Explain their properties and applications.
   b) Explain injection moulding with a neat diagram.

(OR)

6. a) Give an account on the significance of biodegradable polymers.
   b) What are the functions of plasticizers and reinforcing agents during the compounding?
7. a) Explain briefly the ultimate analysis of coal.
   b) Write the significance of ultimate analysis.

(OR)

8. (a) A sample of coal was found to have the following composition C=75%, H= 5.2%, O= 12.8%, S=1.2%, N=3.7% and ash=2.1%. Calculate the minimum amount of air required for complete combustion of 1 kg of coal.
   (b) Write advantages and disadvantages of hydro power and biomass energy.
9. a) Write short notes on Biodiesel and Biosurfactants.
   (b) What are carbon nano tubes? Give their applications.

(OR)

10. Explain the concept of R4M4 with special reference to Econoburette and survismeter?

Code No.: **70201** | **MR17**

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Basic Electrical and Electronics Engineering**

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

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Write about source transformation
2. Define magnetic circuit.
3. Define phase and phase difference
4. Draw the characteristics of p-n junction diode.
5. Write the applications of Tunnel Diode.

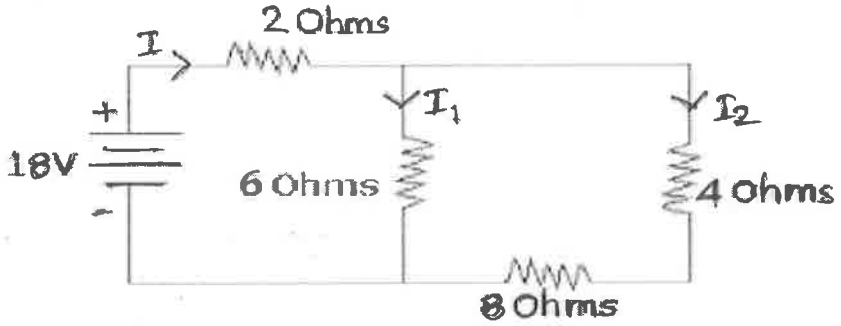
PART-B

Answer ALL questions of the following **5x 10 Marks= 50Marks**

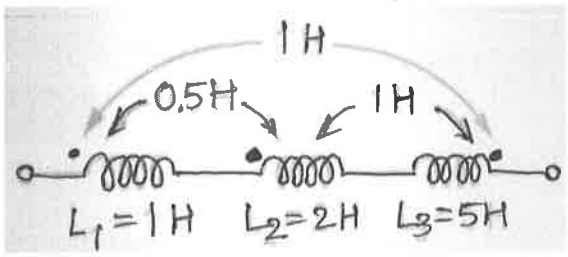
1. a) State and explain Kirchhoff's laws with an example.
   b) What are the limitations of the Kirchhoff's laws? [7+3]

(OR)

2. For the circuit shown in fig., calculate the current in the various branches and the power delivered and consumed.



3. a) The air gap in magnetic circuit is 1.5mm long and 2500mm^2 in cross sectional area. calculate i) reluctance ii)MMF required to set up a flux of 800 μwb in air gap .
   b) Find the total inductance of three series connected coupled coils as shown in figure below:



(OR)

4. Two coils of number of turns N_1 =1000, N_2 =400 respectively are placed near each other. They are magnetically coupled in such a way that 75 % of flux produced by one of 1000 turns links other. A current of 6 ampere produce a flux of 0.8 mWb in N_1 and same amount of current produces a flux of 0.5 mWb in the coil of N_2 turns. Determine L_1,L_2,M,K for coils.

5. A coil of inductance 80mH and resistance of 60Ohm is connected to a 230V, 50Hz supply. Find the following: impedance, the current flowing, the phase difference between the supply voltage and current, voltage across the inductance, voltage across the resistance, active power, reactive power and draw the phasor diagram.[10]

(OR)

6. Explain the sinusoidal response of series RC circuit with circuit diagram, phasor diagram and waveforms along with mathematical expressions.

7. Explain zener diode operation and its characterizes with neat sketches.

(OR)

8. Write short notes on P-N junction Diode?. Explain about V-I characteristics of P-N junction Diode?

9. Explain the working of Tunnel diode and its V-I characteristics. And what is the sufficient condition for tunneling.

(OR)

10. Discus series diode configuration and parallel diode configuration

Code No.: **70301** | **MR17**

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **Engineering Graphics**

Branch: **Common to EEE & ECE, IT**

Time: 3 hours **Max. Marks: 60**

Answer ALL questions of the following **5x 12 Marks= 60Marks**

1. Draw the involute of a circle of 40 mm diameter and also draw a tangent and a normal at a point of 95mm from the center of the circle.

(OR)

2. The asymptotes of a hyperbola are inclined at 75^0 to each other. A point Q on the curve is 35mm and 45mm from the asymptotes. Construct the curve showing at least 5 points on either side of Q.
3. The front view of a line AB 80 mm long measures 55 mm while its top view measures 70 mm. End A is in both HP and VP. Draw the projections of the line and find its inclinations with the reference planes.

(OR)

4. A line AB 75mm long is inclined at 30^o to the V.P. and 45^o to the H.P. its end B is in the H.P. and 40 mm in front of V.P. draw its projections
5. A pentagonal prism of base side 35mm, axis height 60mm is resting on HP on one of its base edges with its axis inclined at 45° to HP and parallel to VP. Draw the projections of the prism.

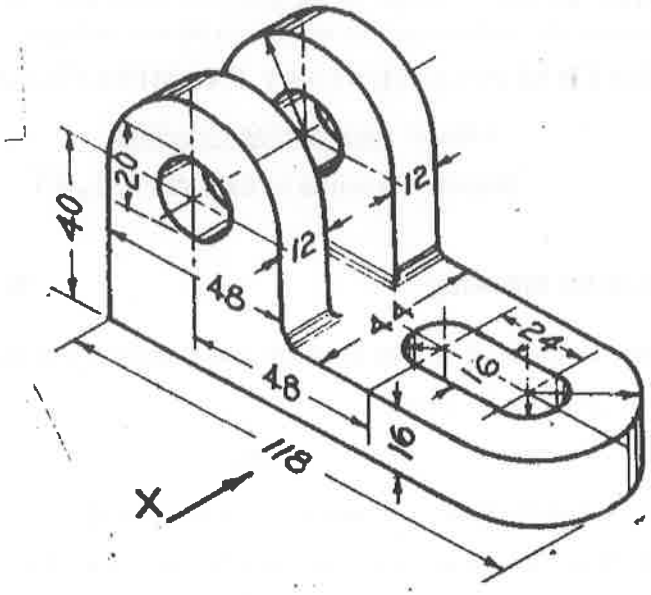
(OR)

6. Draw the projections of a right cylinder of diameter 45mm and axis 60mm when its axis makes an angle of 30^0 with the HP and 45^0 with VP.
7. A hexagonal prism, having a base with a 20mm side and 60mm height is resting on the base in HP such that one of the rectangular faces is parallel to the VP. It is cut by a plane perpendicular to VP and 60 degrees inclined to HP and cutting the midpoint of the axis of the solid. Draw development of lateral surface of the bottom part of the solid.

(OR)

8. Draw the development of the lateral surface of the truncated triangular pyramid resting on H.P with one of its edges perpendicular to V.P and is cut by a plane inclined at 30^0 to H.P and the plane is passing through the axis at a distance of 20 mm from the vertex. The edge of the base is 30 mm and the length of the axis is 40 mm.

9. Draw the orthographic projections of the object whose isometric view is shown below.



(OR)

10. Explain the following drawing entities with figures (i) Line (ii) Polygon (iii) Arc (iv) Ellipse and (v) Circle