Code No.: **70B01** | **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-2019

Subject: **ENGINEERING MATHEMATICS**

Branch: **Common to ALL**

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

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. Find whether the following system of equations are consistent or not
   $x-3y-8z=-10, 3x+y-4z=0, 2x+5y+6z=13$
2. Show that the matrix $\begin{bmatrix} 1 & 2+3i & 3-4i \\ 2-3i & 0 & 2-7i \\ 3+4i & 2+7i & 2 \end{bmatrix}$ is Hermitian
3. Form the deferential equation by eliminating the arbitrary constant 'c':
   $y=1+x^2+c\sqrt{1+x^2}$
4. Find the particular solution of the differential equation $\left(D^2+9\right)y=\cos 3x$
5. Find the Laplace transform of $t.\cos at$

PART-B

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

1. a) Write the normal form of a given matrix and reduce the matrix
   $A=\begin{pmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{pmatrix}$ into normal form and hence find its rank.

   b) Express the following system in matrix form and solve by Gauss Elimination method.
   $2x_1+x_2+2x_3+x_4=6; 6x_1-6x_2+6x_3+12x_4=36$
   $4x_1+3x_2+3x_3-3x_4=-1; 2x_1+2x_2-x_3+x_4=10$

   OR

2. Find the LU decomposition of $\begin{pmatrix} 2 & 2 & 3 \\ 4 & 5 & 6 \\ 1 & 2 & 4 \end{pmatrix}$

3. a) Find the eigen values and eigen vectors of the matrix $A=\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

b) If $A=\begin{bmatrix}2 & 3\\ 1 & 2\end{bmatrix}$, then express A^4 as a linear polynomial in A.

OR

4. Compute the value of $A^6 - 5A^5 + 8A^4 - 2A^3 - 9A^2 - 31A - 36I$

using Cayley - Hamilton theorem, if $A=\begin{pmatrix}1 & 0 & 3\\ 2 & 1 & -1\\ 1 & -1 & 1\end{pmatrix}$

5. a) 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.

   b) If the air is maintained at 30 ^{0}C and the temperature of a body cools from 80 ^{0}C to 60 ^{0}C in 12 minutes, find the temperature of the body after 24 minutes.

OR

6. Solve : $(4y + x + 2)\,dy - (y + x - 1)\,dx = 0$
7. a) Solve the differential equation $(D^4 + 2D^2 + 1)y = x^2\cos^2 x$

   b) Solve $(D^2 + 4)y = \sec 2x$ by the method of variation of parameters.

OR

8. Solve, the differential equation $(D^2 + a^2)y = tanax$, by the method of variation of parameters.
9. Solve the differential equation $\frac{d^2x}{dt^2} + 9x = \sin t$ using Laplace transform, given that

   $x(0) = 1$ *and* $x\left(\frac{\pi}{2}\right) = 1$

OR

10. Find the $L^{-1}\left\{log\sqrt{\frac{(s^2+1)}{s(s+1)}}\right\}$.

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

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **ENGINEERING PHYSICS**

Branch: **Common to ALL**

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

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. What do you mean by constructive and destructive interference of light?
2. State the characteristic of simple harmonic motion.
3. Define coordination number and atomic packing fraction.
4. Find the de Broglie wavelength associated with electron having energy of 100eV.
5. Explain the significance of surface to volume ratio of nanoparticles.

PART-B

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

1. a) Explain the phenomenon of interference by Young's double slit experiment and obtain the expression for resultant intensity analytically. [7M]
   b) Two slits are separated by a distance of 0.2mm are illuminated by a monochromatic light of wavelength of 550nm. Calculate the fringe width on the screen at a distance of 1meter from the slits. [3M]

OR

2. a) Explain the formation Newton's ring in reflected light with neat diagram and prove that the diameter of dark ring varies as square root of natural number [7M]
   b) State the factors on which the resolving power of grating depends. [3M]
3. a) Distinguish between free and forced oscillations.
   b) Discuss the analogy between mechanical and electrical oscillators. [4+6M]

OR

4. a) Find the solution for the differential equation of a damped harmonic oscillator. [7M]
   b) Explain the behavior of damped harmonic oscillator using its solution (under damp ,critical damp and over damp) [3M]
5. a) Derive the expression for interplanar spacing between consecutive planes described by miller indices. [6M]

b) State and explain Bragg's law of diffraction. [4M]

OR

6. a) Define lattice point, Bravais lattice and primitive cell. Explain the seven crystal systems with neat diagrams. [7M]

   b) The Bragg angle corresponding to the first order reflection from plane (111) in a crystal is 30 degrees when X-rays of wave length 1.75A are used. Calculate inter atomic spacing. [3M]

7. a) Derive Schrodingers time independent and time dependent wave equations. [7M]

   b) An electron is confined to move in a one dimensional potential well of length 5A. Find the quantized energy values for the three lowest energy states. ($h = 6.63 \times 10^{-34}$J.s, and $m = 9.11 \times 10^{-31}$Kg). [3M]

OR

8. a) An electron is trapped in a one dimensional box of 0.1 nm length .calculate the energy required to excite it from its ground state to fifth excited state [4M]

   b) Show that the energy is quantized for a particle confined in 1-D box [6M]

9. a) Explain the factors that influence the different properties of nanomaterials.

   b) Write notes on carbon nanotubes.

OR

10. a) "Nanomaterials behave differently when compared to their macroscale counterparts" Explain [6M]

    b) Describe CVD (Chemical vapor deposition) technique for the synthesis of nanomaterials. [4M]

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

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I B.TECH ISEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **APPLIED CHESISTRY**

Branch:**COMMON TO CE,ME,MINING**

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

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. What is Reverse Osmosis?
2. Define electrochemical cell.
3. Why is PVC used in chemical industries?
4. Why is it necessary to remove sulpher from fuel?
5. What are the functions of matrix & dispersed phase in composites?

PART-B

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

1. a) What are the causes of hardness of water? Give the disadvantages of hard water.
   b) Calculate the amount of lime and soda required per litre for the chemical treatment of water containing: Ca^{2+} = 80 ppm; Mg^{2+} = 36 ppm; K^{+} = 39 ppm; HCO_3^- = 244 ppm; $FeSO_4$, $7H_2O$ added as coagulant = 69.5 ppm.

OR

2. a) Differentiate between internal & external treatment.
   b) What are Boiler troubles? Write an account on sludge and scales.
3. a) Write the construction & reactions of Ni-Cd cell.
   b) Write the differences between primary and secondary cells.

OR

4. What is the principle involved in cathodic protection? Explain the method of sacrificial anodic protection and mention its advantages and disadvantages.
5. Explain the functions of different compounding materials added to plastic resins and write a short note on compressed moulding with neat diagram.

OR

6. a) Define an Elastomer. Explain the process of Vulcanization of Natural Rubber.
   b) Write a note on Fibre- Reinforced Plastics.
7. a) Define fuel. How are fuels classified?
   b) Explain briefly the ultimate analysis of coal.

OR

8. Explain the synthesis of petrol by fischer-tropsch's process.
9. How ultrasonic , microwave assisted reactions and solvent free reactions are useful in green chemistry with one example.

OR

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

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

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I B.TECH ISEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **ENGINEERING GRAPHICS**

Branch:**COMMON TO EEE,IT**

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

Answer ALL questions of the following **5x12 M= 60M**

1. The distance between two towns is 225 km. a train covers this distance in 5 hours. Construct a scale to measure off the distance covered by the train in a single minute and up to 1 hour. The scale is drawn to 1/(300000). Show on it the distance covered in 47 minutes.

OR

2. A circle having a 50 mm diameter rolls within a circle with a 150 mm diameter with internal contact. Draw the locus of a point lying on the circumference of the rolling circle for its complete turn. Name the curve. Also draw a tangent and a normal to the curve, at a point that is 40 mm from the centre of the bigger circle.
3. The front view of a 125mm long line PQ measures 75mm and its top view measures 100mm its end Q and the midpoint M are in the first quadrant being 20mm from both the planes draw the projections of the line PQ.

OR

4. The projectors of the ends of a line AB are 5 cm apart. The end A is 2 cm above the H.P and 3cm in front of V.P. The end B is 1cm below H.P. and 4 cm behind the V.P. Determine the true length, and its inclination with the two planes.
5. A hexagonal prism of base side 30mm, axis height 50mm is resting on HP on one of its base corners with its base inclined at 35° to HP and parallel to VP. Draw the projections of the prism.

OR

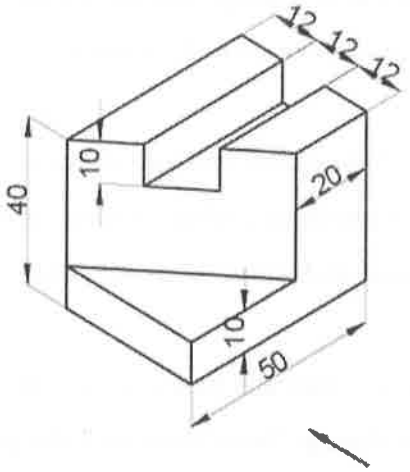
6. A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP and all the edges of the base equally inclined to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view, sectional side view and true shape of the section.
7. A hexagonal pyramid of base side 30mm and height 60mm rests on its base on HP with two of its base edges perpendicular to VP. It is cut by a plane perpendicular to VP and inclined at 25° to HP, meeting the axis at a point 25mm above the base of the pyramid. Draw the isometric projection of the truncated pyramid.

OR

8. A right regular pentagonal pyramid, side of base, 36 mm and height 64 mm, rests on its base upon the ground with one of its base sides parallel to VP. A sectional plane perpendicular to VP and inclined at 30^0 to HP cuts the pyramid, bisecting its axis. Draw the development of the truncated pyramid.
9. Explain the following drawing entities with figures (i) Line (ii) Polygon (iii) Arc (iv) Ellipse and (v) Circle.

OR

10. Draw any three Orthographic views for the isometric view shown in figure below:



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

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

I B.TECH ISEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **COMPUTER PROGRAMMING**

Branch:**COMMON TO ALL**

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

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. Draw a flow chart to find weather given number is even or odd.
2. What is an array? How to declare a two dimensional array?
3. Write the syntax for malloc and calloc functions.
4. Define global variable.
5. Explain argv[ ] in command line argument.

PART-B

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

1. Explain following concepts
   i) Write the rules for constructing Algorithm.
   ii) Write a program to check the given number is Armstrong or not and also draw the flowchart.

OR

2. a) Explain the basic structure of C program. [4M]
   b) Write a C program to find greatest of 3 numbers using ternary operator. [6M]
3. Write a program to print the sum of two dimensional Array elements.

OR

4. What is an array? What is the difference between a variable and an array? Write a program to print the smallest and largest element in a array.
5. How Arrays are closely related to Pointers, explain?

OR

6. a) What is a pointer variable? What is the relationship between pointers and arrays? [4M]
   b) Write a C program to find the sum of elements of array using pointers. [6M]
7. How to perform Structure manipulations using functions, explain?

OR

8. a) Distinguish between an array of structures and an array within a structure. Give an example to each.
   b) Explain how to pass complete structure as argument to function with and example.
9. Write a program to open a file in write mode and write some data in to it.

OR

10. a) Write a program to open a file and read the file and print the file contents in Reverse order.
    b) What is the concept of Selection sort? Take your own example to implement Selectionsort program in C.

Code No.: 70201

MR17

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

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

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

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. Write about source transformation.
2. Explain Flemings right hand rule.
3. Draw impedance triangle for RC series Circuit.
4. What is a PN junction? How is it formed?
5. What are the Types of filters?

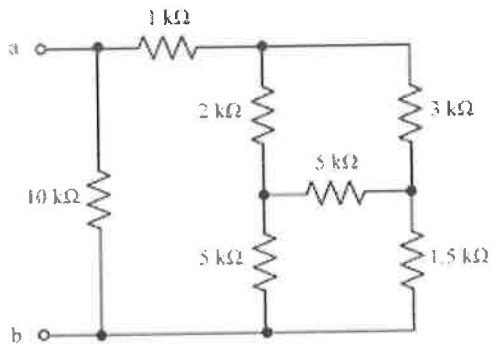
PART-B

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

1. Derive the expression for star to delta and delta to star transformation.

OR

2. Find Equivalent resistance as shown in figure.



3. Bring out an analogy between magnetic circuits and electric circuits.

OR

4. Explain hysteresis and eddy current losses.
5. A coil of resistance 5Ohm and inductance 120mH in series with a 100microF capacitor is connected to a 415V, 50Hz supply. Calculate: impedance, the current flowing, the phase difference between the supply voltage and current, voltage across the coil, voltage across the capacitor, active power, reactive power and draw the phasor diagram.

OR

6. Explain the steady state analysis of series R,L,C with Sinusoidal excitation.
7. a) Explain band structure of open circuit PN junction diode.
   b) Explain current components of PN junction diode.

OR

8. a) Explain Zener diode operation and its characteristics with neat sketches.
   b) Explain formation of depletion layer.
9. Explain the working of Tunnel diode and its V-I characteristics. What is the sufficient condition for tunneling?

OR

10. a) Explain principle of operation and characteristics of LED and LCD diode.
    b) Compare LED and LCD.