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, MAY-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 value of "k" such that the rank of $\begin{pmatrix} 1 & 2 & 3 \\ 2 & k & 7 \\ 3 & 6 & 10 \end{pmatrix}$ is 2.
2. Define Algebraic and geometric multiplicity of characteristic root
3. Find the integrating factor of the differential equation $x\frac{dy}{dx} + y = x^2y^6$
4. Solve : $y'' - 6y' + 9y = 0$
5. State and prove first shifting theorem in Laplace transform.

PART-B

Answer ALL questions of the following **5x10 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. Determine the values of α for which following equations are consistent and solve the system for these values ofα. $x + 2y + z = 3,\ x + y + z = \alpha,\ 3x + y + 3z = \alpha^2$.

3. (a) State Cayley-Hamilton Theorem. Verify Cayley-Hamilton Theorem for the matrix $A=\begin{pmatrix} 8 & -8 & 2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{pmatrix}$. Hence find A^{-1}

(b) If λ be an eigen value of a non-singular matrix A corresponding to eigen vector X, then prove that λ^n is eign value of A^n corresponding to the eigen vector X. [5+5]

OR

4. Reduce the quadratic form $3x_1^2+3x_2^2+3x_3^2+2x_1x_2+2x_1x_3-2x_2x_3$ to a canonical form. Also find its index, signature and nature.

5. (a)Solve the differential equation $\left(1+y^2\right)dx=\left(\tan^{-1}y-x\right)dy$ [5+5]

(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 12minutes, find the temperature of the body after 24 minutes.

OR

6. a) Solve $\left(1+e^{\frac{x}{y}}\right)dx+e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dy=0$

b) A body is originally at 80^oC cools down to 60^oC in 20 minutes, the temperature of air being 40^oC. What will be the temperature of the body after 40 minutes from the original?

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

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

OR

8. Solve, by the method of variation of parameters, $y^{11}-2y^1+y=e^x\log x$

9. (a) Find $L\left[\frac{\cos 4t\sin 2t}{t}\right]$ [5+5]

(b) State convolution theorem. Use convolution theorem find $L^{-1}\left[\frac{s^2}{\left(s^2+4\right)^2}\right]$

OR

10. (a)Find the Laplace inverse transform of $\log\left(\frac{s^2+4}{s^2+9}\right)$ [4+6]

(b) Solve the following differential equation using the Laplace transforms

$$\frac{d^2y}{dx^2}+2\frac{dy}{dx}+2y=5\sin t, y(0)=y'(0)=0$$

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

Subject: **Engineering Physics**

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 interference.
2. Write the differential equation of Damped harmonic oscillator.
3. State Bragg's law of diffraction.
4. What is de-Broglie hypothesis?
5. What is Quantum confinement?

PART-B

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

1. a). Write any three differences between special and temporal coherence . (3+7)
   b). Explain how a plane transmission grating is used to determine the wavelength of light.

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 (7)
   b) In Newton's rings experiment, diameter of 10^{th} dark ring due to wavelength 6000Å in air is 0.5 cm. Find the radius of curvature of lens. (3)

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) What are the characteristics of SHM
   b) Obtain the differential equation for a simple harmonic oscillator and derive the expression for total energy of the oscillator. (2+8)

5. Describe the seven systems of crystals with suitable diagrams and give the relation of lengths of axes and the relation of angles between the axes of a unit cell in each type.

OR

6. a)State and explain Bragg's law of diffraction.
   b)Describe the powder method of X-ray diffraction. (3+7)

7. a) Explain de-Broglie's concept of matter waves (4+6)
   b) Give an account of Davisson and Germer experiment to show wave like character of a beam of electron.

OR

8.a) Write the mathematical characteristics of wave function. (4)
   b) Show that the energy is quantized for a particle confined in 1-D box (6)

9. a) What is nano technology
   b) What are the different methods of synthesis of nanomaterials? (2+8)

OR

10. a) Explain surface to volume ratio in nanomaterials
    b) Describe the synthesis of nanomaterials using vapor deposition method. (4+6)

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-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. What is mean reference electrode? Give examples
3. Define Homo & Co-polymers
4. Why a good fuel must have low ash content?
5. Explain the characteristics of nanowires.

PART-B

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

1. Explain the softening of hard water by Ion-exchange process and give its advantages and disadvantages?

OR

2. a) write the chemical reactions required to calculate the amount of lime & soda for softening of water.
   (b) Write formulae for lime & soda required.
3. a) Write Nernst equation. Explain all the terms in it.
   b) Write the construction & reactions of Ni-Cd cell.

OR

4. What is the principle involved in cathodic protection? Explain the method of sacrificial anodic protection and mention its advantages and disadvantages.
5. a) Define the following with suitable examples.
   i) polymer ii) plastics iii) Fibers iv) Rubbers
   b) Give a brief account on Biodegradable polymers.

OR

6. Explain the functions of different compounding materials added to plastic resins and write a short note on compressed moulding with neat diagram.
7. a) Explain briefly the ultimate analysis of coal.
   b) write the significance of ultimate analysis.

OR

8. Explain the synthesis of petrol by fischer-tropsch's process.
9. a) Write the principles of green chemistry.
   b) Explain any two solvent free reactions.

OR

10. a)Write the composition and characteristics of composites.
    b) What are biofuels? Are biofuels environmentally friendly?

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

Subject: **English**

Branch: **Common to EEE & ECE**

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

PART – A

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

1. a) My flat is _____ the fifth floor. (use correct 'Preposition')
   b) _____ interpret = interpret wrongly. (use suitable 'Prefix')
2. a)Raju hits Ravi. (Change into passive voice)
   b) He has reading a book -------- . (Correct the sentence)
3. a) One of the students ------ (has/have) read the book. (use appropriate verb form)
   (b)Call it a day (Write the meaning of this idiom)
4. a) You are working in Deloitte, _____ ? (write the suitable **question tag**)
   b) That which is incapable of reading (write **one-word substitute**)
5. a) She prefers coffee than tea. (correct the sentence)
   b) He told me that he was happy to be there that evening. (change to 'Direct Speech')

PART-B

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

1. Minimalism is a tool to achieve fulfillment and happiness in life." Substantiate.

OR

2. Describe the two roads that the speaker comes across. Which road does he choose?
3. Write a paragraph on 'Ragging is a heinous crime.' (word limit : 300 words)

OR

4. Do you think one need to discard certain things from life to lead a happy life? Support your answer.
5. Write an essay on 'Role of Youth in Nation Building.' (word limit : 300 words)

OR

6. What are some of the life's most important things one must focus on to be happy?
7. Write a letter to the editor of a newspaper about traffic congestion in your city.

OR

8. Write a letter to your Head of the Department requesting for the change of examination dates. State your reasons.
9. a) According to Burnam what kind of people can attain "pecuniary independence"?
   b.What differences does the poet Maya Angelou in the poem 'Human Family' see in a/any family?

OR

10. a) Sum up Barnum's 'Warnings' to men and women regarding social pressures.
    b) What differences does the poet Maya Angelou in the poem 'Human Family' see in a/any family?

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MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

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I B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-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 Control Statement and list out the types?
3. What is a pointer? Give the syntax to declare a pointer to an integer variable?
4. Discuss about Structures
5. Write the syntax for opening a file in C.

PART-B

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

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

OR

2. a) What is a multidimensional array? How is it initialized? How are the elements Of multidimensional arrays stored? Comment on the accessing of the elements. [6M]
   b) Write a c program to find root s of a quadratic equation [4M]

3. Discuss about for and while loop statements. Write a C program for printing the prime numbers two numbers 'a' and 'b'. [10M]

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) Write a program to swap two numbers using pointers. [4M]
   b) Explain about different string functions which can be performed on strings. [6M]

OR

6. How to declare an array of strings? Write a C program to sort an array of strings. [10M]

7. a) How to declare a function and differentiate calling and called function? Explain with an example program. [6M]
   b) Write a recursive program for finding the N^{th} Fibonacci value, using functions. [4M]

OR

8. a) Explain the following [3M+3M]
   i) Actual Parameters ii) Formal Parameters
   b) What is storage class? List and explain with example [4M]

9.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 Selection sort program in C

OR

10. Define searching? Write a c program to search an element using binary search using recursion.

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

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

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

Subject: **Engineering Graphics**

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

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

Answer ALL questions of the following **5x12Mark=60Marks**

1. Draw an ellipse, when the distance of the focus from the directrix is equal to 60 mm and eccentricity 2/3. Also draw a normal and a tangent to the curve at a point 35 mm from the focus

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. A regular hexagonal lamina of 30 mm side rests with one of its edges CD parallel to HP. Its plane is inclined at 45^0 to HP and Draw its projections.

OR

4. a)A point P is 15mm above the H.P. and 20mm infront of V.P. another point Q is 25mm behind V.P. and 40mm below H.P. draw the projection of P & Q keeping the distance between their projectors equal to 90mm. draw strait lines joining their i) front views ii) top views
   b) state the quadrants in which the following points are situated
   i) A point P ; its top view is 40mm above XY, the front view 20mm below the top view
   ii) A point Q ; its projections coincide with each other 40mm below the XY

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

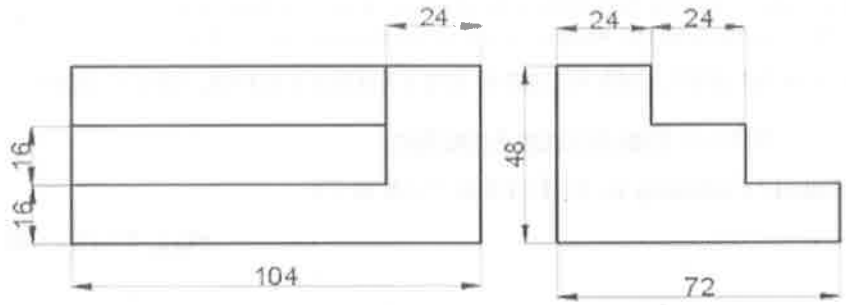
6. Draw the projection of the square pyramid base 25mm side and axis 50mm long is resting on one of its triangular faces on the H.P. with the axis inclined at 45^o to the V.P.

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

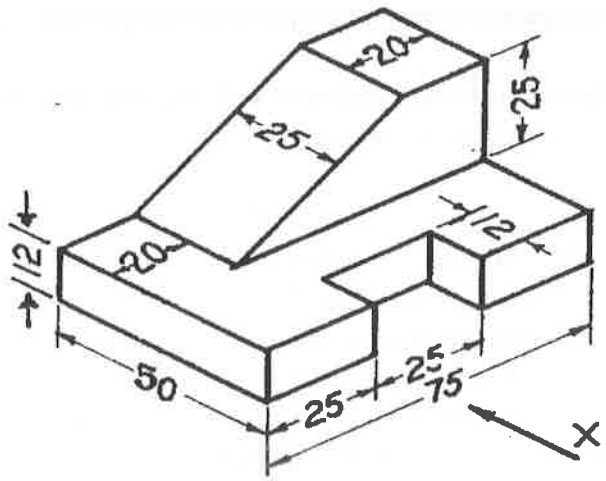
8. A vertical cylinder of base diameter 50 mm and height 70 mm is cut by a plane inclined at 55^0 to HP and perpendicular to VP, which meets the axis at a distance of 20 mm from top base. Draw the isometric view of the remaining portion of the cylinder.

9. Draw Isometric view for the orthographic projections shown in the figure below:



OR

10. Draw the front view, top view, & side view for the part shown in following figure. All dimensions are in mm.



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MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

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

Subject: **Basic Electrical & Electronics Engineering**

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

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

PART – A

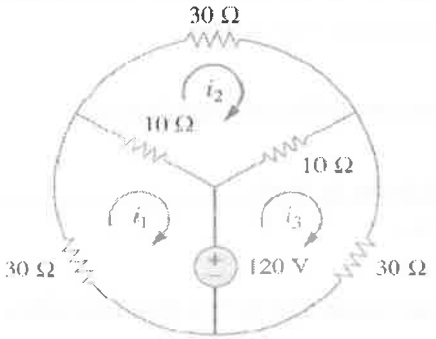
Answer ALL questions of the following **5x2Mark=10 Marks**

1. Write about source transformation
2. Write two dis-similarities between electrical and magnetic circuits
3. A waveform has a form factor of 1.2 and a peak factor of 1.5. If the maximum value is 100, find the rms value and average value.
4. What is the effect of temperature on the V-I characteristics of p-n junction diode.
5. Write application of photo diode

PART-B

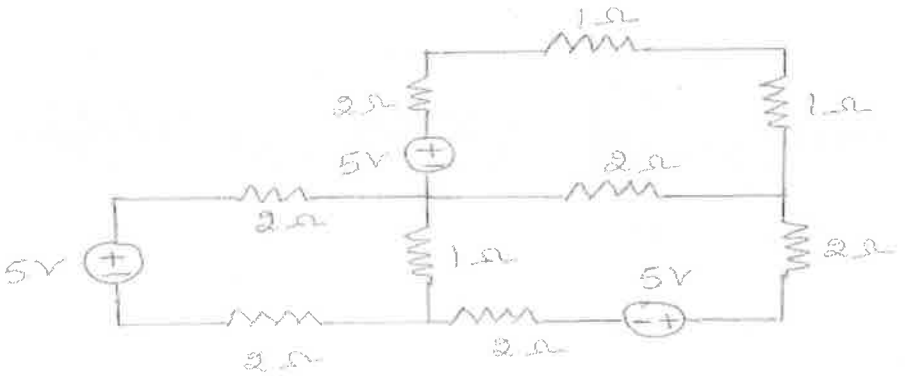
Answer ALL questions of the following **5x10 Marks= 50Marks**

1. Find i1, i2, and i3 for the circuit shown in figure below applying mesh analysis.

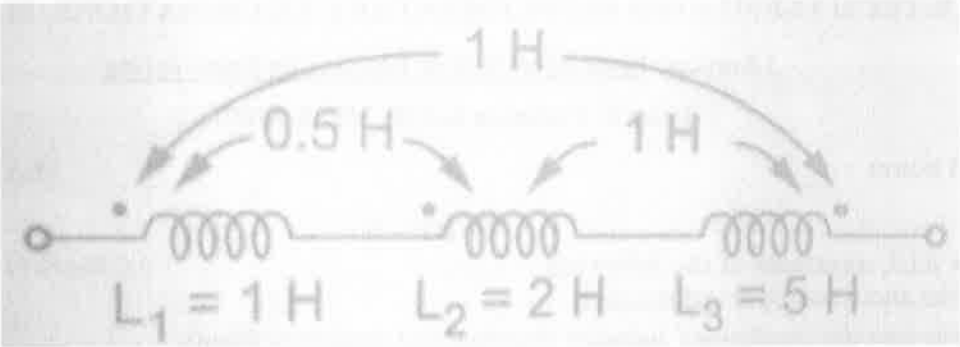


OR

2. Find the currents in batteries as shown in figure



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. Explain hysteresis and eddy current losses.

5. a)Explain steady state analysis of pure resister with sinusoidal excitation
   b) An ac circuit consist of pure resistance of 10Ω and is connected across an AC supply of 230V, 50hz . calculate i)current ii)power consumed

OR

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

7. Explain transition capacitance and diffusion capacitance

OR

8. a) Explain break down mechanism in diode
   b) Write about diode resistance

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

OR

10. Find average value, RMS value, Form Factor and Peak factor for half wave and full wave rectifier