

Code No: R18A0201

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, June 2022**

**Basic Electrical Engineering**

**(EEE, ECE, CSE & IT)**

<b>Roll No</b>									
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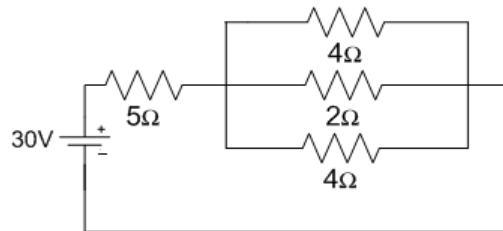
**Time: 3 hours**

**Max. Marks: 70**

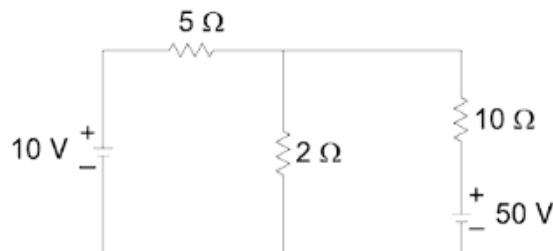
Answer Any **Five** Questions  
All Questions carries equal marks.

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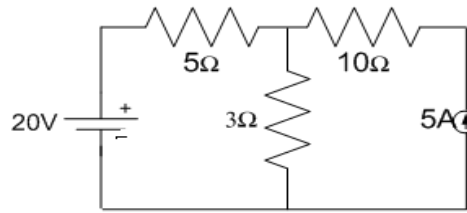
- 1      a) Enumerate dependent and independent sources in detail. [7M]  
       b) Obtain energy expressions for RLC elements. [7M]
  
- 2      a) How do you convert a voltage source into an equivalent current source and vice-versa? Discuss with an example. [7M]  
       b) Illustrate Kirchoff's current law in briefly with an example. [7M]
  
- 3      a) Calculate the total current in the circuit shown below: [7M]



- b) Write the mesh equations and determine the loop currents in the circuit shown below. [7M]



- 4      a) State and explain Thevenin's theorem in detail with a neat circuit. [7M]  
       b) Determine the current passing through 5 ohm resistor using superposition theorem. [7M]



- 5 a) Derive the expression for rms value of sinusoidal waveform. [7M]  
 b) Define the following terms [7M]  
 i) Impedance ii) Admittance iii) Power Factor iv) Real power
- 6 A resistance of 20 ohm, inductance of 0.2 H and capacitance of 150μF are connected in series and are fed by a 230 V, 50 Hz supply. Calculate  $X_L$ ,  $X_C$ ,  $Z$ ,  $Y$ , Phase angle, p.f., active power, reactive power and apparent power. [14M]
- 7 a) Derive the emf equation of DC generator. [7M]  
 b) Illustrate the significance of back emf in DC motor. [7M]
- 8 a) Discuss the steps involved in calculations of energy consumption. [7M]  
 b) Elaborate the process used for battery backup. [7M]

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Code No: **R18A0013****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, June 2022****Engineering Chemistry****(EEE, ECE, CSE & IT)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

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- 1 a) Discuss the Nernst equation and its applications [7M]  
b) Write about the H<sub>2</sub>-O<sub>2</sub> fuel cell, its application and advantages. [7M]
- 2 a) Explain the electrochemical corrosion, mechanism of electrochemical corrosion [7M]  
b) Detail the electroplating (Cu plating) & electroless plating (Ni plating), advantages and applications of electroplating/electroless plating [7M]
- 3 Discuss Linear Combination of Atomic Orbitals (LCAO) theory, Molecular orbitals of diatomic molecules, and molecular orbital energy level diagrams of N<sub>2</sub> and O<sub>2</sub> [14M]
- 4 Explain the salient features of CFT and crystal field splitting of transition metal ion d-orbitals in the tetrahedral and octahedral geometries [14M]
- 5 a) Discuss the hardness of water and the types & units of hardness [7M]  
b) Write a Note on softening of water by Ion exchange process [7M]
- 6 a) Detail the disinfection methods like chlorination and ozonization [7M]  
b) Give a note on desalination of water by Reverse Osmosis [7M]
- 7 a) Write the differences between mechanism of SN1 and SN2 [7M]  
b) What Markownikoff rule? Explain it with a suitable example [7M]
- 8 a) What is the fuel? Write the characteristics of a good fuel [7M]  
b) Discuss the proximate and ultimate analysis of Coal and their significance [7M]

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Code No: **R18A0301****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, June 2022****Engineering Graphics****(ME & AE)**

<b>Roll No</b>									
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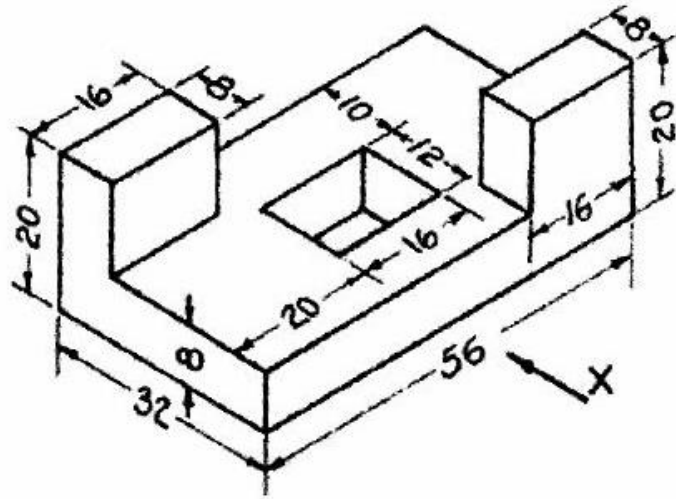
**Time: 3 hours****Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

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- 1 A vertex of a hyperbola is 65mm from its directrix. Draw the curve if the eccentricity is  $5/2$ . Draw a tangent and a normal to the curve at any point on the curve. [14M]
- 2 The distance between Delhi and Agra is 200 km. In a railway map it is represented by a line 5 cm long. Find it's R.F. Draw a diagonal scale to show single km. And maximum 600 km. Indicate on it following distances. 1) 222 km 2) 336 km 3) 459 km 4) 569 km [14M]
- 3 Draw the projections of the following points, keeping the distance between the projectors as 20 mm on the same reference line. [14M]
  - A- 20 mm above H.P and 40 mm in front of V.P
  - B- 30 mm above H.P and 50 mm behind V.P
  - C- 25 mm below H.P and 35 mm behind V.P
  - D- 40 mm below H.P and 25 mm in front of V.P
  - E- 50 mm above H.P and on V.P
  - F- in the VP and 40 mm above the HP
  - G- in the HP and 20 mm behind the VP
- 4 A line AB, 65 mm long, has its end A 20 mm above the H.P and 25 mm in front of the V.P. The end B is 50 mm above the H.P and 60 mm in front of the V.P. draw the projections of AB [14M]
- 5 A hexagonal plane with a 35 mm side has a centrally punched circular hole of 36 mm diameter. An edge of the plane is in the V.P. with its surface perpendicular to the H.P., and inclined at  $45^0$  to the V.P. Draw its projections. [14M]
- 6 A pentagonal pyramid, base 25mm side and axis 50mm long has one of its triangular faces in the V.P. and the edge of the base contained by that face makes an angle of  $30^0$  with the H.P. Draw its projections. [14M]
- 7 Draw isometric view of a cylinder of base diameter 55 mm and axis length 65 mm [14M] when the axis of the cylinder is (i) vertical (ii) horizontal.

- 8 Draw the following views of the object given in figure below. All dimensions are in mm. [14M]  
a) Front view b) Top view and c) Right side view.



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Code No: **R18A0015****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, June 2022****Engineering Physics****(ME & AE)**

<b>Roll No</b>									
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**Time: 3 hours****Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

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- 1 Give expressions for equation of motion of a damped harmonic oscillator and discuss various damping conditions mathematically. [14M]
- 2 Deduce the equation of motion and its solution for a forced damped harmonic oscillator. [14M]
- 3 Distinguish the terms division of wave front and division of amplitude and Deduce the expression for the intensity maxima and intensity minimas for light reflected from a thin transparent film. [14M]
- 4 A. Explain Fraunhofer diffraction due to single slit. [10M]  
B. Explain resolving power of grating [4M]
- 5 Discuss the propagation of electron in a periodic potential using Bloch theorem and explain the formation of energy bands in solids. [14M]
- 6 Explain effective mass and classify the solids into metals, semiconductors and insulators using band diagram. [14M]
- 7 Distinguish dia, para, ferro, anti ferro and ferri magnetic materials and their applications. [14M]
- 8 A. Discuss the construction and working of Ruby Laser and its Applications. [10M]  
B. In a 50mW Ruby laser what is the number of photons emitted per second. [4M]

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Code No: R18A0022

## MALLA REDDY COLLEGE OF ENGINEERING &amp; TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, June 2022

Mathematics-II

(Common to all branches)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions  
All Questions carries equal marks.

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- 1 a) Write working rule of Bisection Method [4M]  
b) Evaluate a positive root of  $x^3 - x - 1 = 0$  by bisection method. [10M]
- 2 Using Lagrange's interpolation formula, find  $y(4)$  from the following table. [14M]

$x$	0	2	3	6
$y$	-4	2	14	158

- 3 Find out the value of  $\int_0^1 \frac{1}{1+x} dx$  using (i) Trapezoidal Rule [7M]  
(ii) Simpson's  $\frac{1^{rd}}{3}$  Rule [7M]
- 4 Fit a curve of the form  $y = a e^{bx}$  to the following data by using method of least squares. [14M]

$x$	0	1	2	3	4	5	6	7	8
$y$	20	30	52	77	135	211	326	550	1052

- 5 a) Prove that  $\beta(m, n) = \beta(n, m)$ . [7M]  
b) Prove that  $\int_0^{\frac{\pi}{2}} \sin^2 \theta \cos^4 \theta d\theta = \frac{\pi}{32}$ . [7M]
- 6 a) Evaluate  $\int_0^{\frac{\pi}{2}} \sqrt{\cot \theta} d\theta$ . [7M]  
b) Find  $\int_0^2 x(8 - x^3)^{1/3} dx$ . [7M]
- 7 By change the order of integration evaluate  $\iint xy dx dy$  [14M]
- 8 Verify Green's theorem for  $\int_C (2xy - x^2) dx + (x^2 + y^2) dy$  where C is the closed curve of the region bounded by  $y = x^2, y^2 = x$ . [14M]

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Code No: **R18A0502****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, June 2022****Object Oriented Programming**

(Common to all branches)

<b>Roll No</b>										
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**Time: 3 hours****Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

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- 1 a) Discuss how the data and functions are organized in an object oriented paradigm. List the important features of object oriented programming. **[8M]**  
b) Identify the advantages of object oriented programming over procedure oriented programming. **[6M]**
- 2 a) Write a C++ program to implement a calculator using switch statement. **[7M]**  
b) Classify the basic data types into various categories and explain it. **[7M]**
- 3 Define Constructor. Summarize the various types of constructors with an example. **[14M]**
- 4 a) Create a student class with data members name, rollno and mark. Write a function to read input for these data members. Design a program to display the details for 5 students using array of object. **[10M]**  
b) List out the characteristics of friend function. **[4M]**
- 5 Explain the various types of inheritance with suitable examples. **[14M]**
- 6 a) Illustrate the various access modes and their roles in inheritance with example. **[10M]**  
b) Write a simple C++ program to illustrate the scenario of function overloading. **[4M]**
- 7 a) Define polymorphism. Differentiate runtime polymorphism and compile time polymorphism. **[10M]**  
b) Demonstrate the use of new operator and delete operator with an example. **[4M]**
- 8 Discuss about exception handling in C++ in detail. **[14M]**

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