

Code No: R17A0013

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, October/November 2020****Engineering Chemistry  
(Common to ME & AE)**

<b>Roll No</b>										
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**Time: 2 hours****Max. Marks: 70**

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

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- 1
  - a. Derive the Nernst Equation for single electrode potential. Write the Nernst equation for cell EMF.
  - b. A conductance cell containing 0.01N KCl solution was found to have a resistance of 2573 ohms at 25°C. The same cell when filled with a solution of 0.2N acetic acid had a resistance of 5085 ohm. Calculate the cell constant, specific conductance and equivalent conductance of acetic acid. (Given  $k_v$  of 0.01N KCl is  $0.00141 \text{ ohm}^{-1}\text{cm}^{-1}$ )
  - c. Explain the construction and working of calomel electrode.
- 2
  - a. What is a Galvanic cell? Describe the construction, working of a Daniel cell with cell diagram, cell representation and electrode reactions.
  - b. Explain the construction, functioning and applications of Hydrogen – Oxygen Fuel cell.
- 3
  - a. Define Corrosion. Describe the causes and effects of corrosion.
  - b. Explain the mechanism involved in the rusting of iron in acidic medium with diagram.
- 4
  - a. Explain in detail various factors that influence rate of corrosion.
  - b. What is meant by metal cladding? Explain the process and its significance.
- 5
  - a. Differentiate between chain polymerisation and step polymerisation with examples.
  - b. What are conducting polymers? How the conductance of polyacetylene can be increased by p-doping and n-doping? Explain with mechanism.
- 6
  - a. Write a short note on Fibre Reinforcing Plastics and mention their applications.
  - b. Write an account of preparation, properties and uses of
    - i. Buna-S rubber
    - ii. Poly vinylacetate
  - c. Write the classification of refractories with examples.
- 7
  - a. Explain the zeolite process for the external treatment of boiler feed water. What are its limitations and advantages?
  - b. Write a brief account of break point chlorination and mention its significance.
  - c. What is Calgon conditioning? Mention the reactions involved.

**8**

- a. Explain the ultimate analysis of coal and its significance.
- b. Explain the process of refining of petroleum.

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Code No: R17A0201

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**  
(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, October/November 2020**

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

<b>Roll No</b>									
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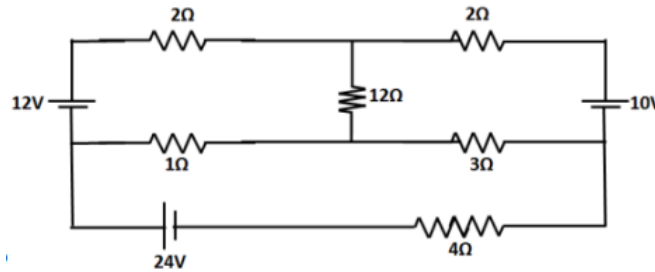
**Time: 2 hours**

**Max. Marks: 70**

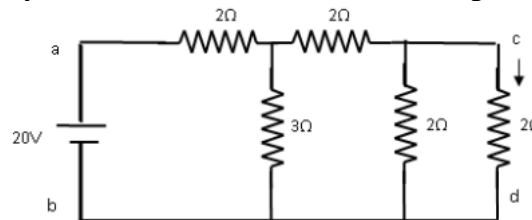
Answer Any **Four** Questions  
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- 1 a) Three resistances of values  $2\Omega$ ,  $3\Omega$  and  $5\Omega$  are connected in series across 20V DC supply. Calculate i) Equivalent resistance of the circuit. ii) The total current of the circuit. iii) The voltage drop across each resistor. iv) The power dissipated in each resistor  
b) Illustrate the classification of electrical circuit elements.
- 2 a) Derive the equation for energy stored in the capacitor and Inductor  
b) Explain about source transformation techniques
- 3 Determine the current in the  $4\Omega$  branch in the circuit shown in Fig below by using mesh analysis method.



- 4 Derive the Star-to-Delta and Delta-to-Star Transformation.
- 5 a) Derive the Steady State Analysis of series R-C circuits  
b) Define Average value and R.M.S. value
- 6 a) A series RLC circuit containing a resistance of  $20\Omega$ , an inductance of  $0.25H$  and a capacitor of  $50\mu F$  are connected in series across a 120V, 50Hz supply. Calculate the total circuit impedance, the circuit's current, power factor.  
b) Define form factor and peak factor
- 7 a) Verify the Reciprocity theorem for the network shown in figure below.



- b) State the superposition theorem with an example.

- 8** a) Two coils A and B with self inductances  $L_a$  and  $L_b$  respectively are connected in series. If the mutual inductance is  $M$ , find equivalent inductance.
- b) ) Establish the relation between polarity of the windings and dot convention with the help of diagram.

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Code No: **R17A0302****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, October/November 2020****Engineering Drawing****(ME&AE)**

<b>Roll No</b>									
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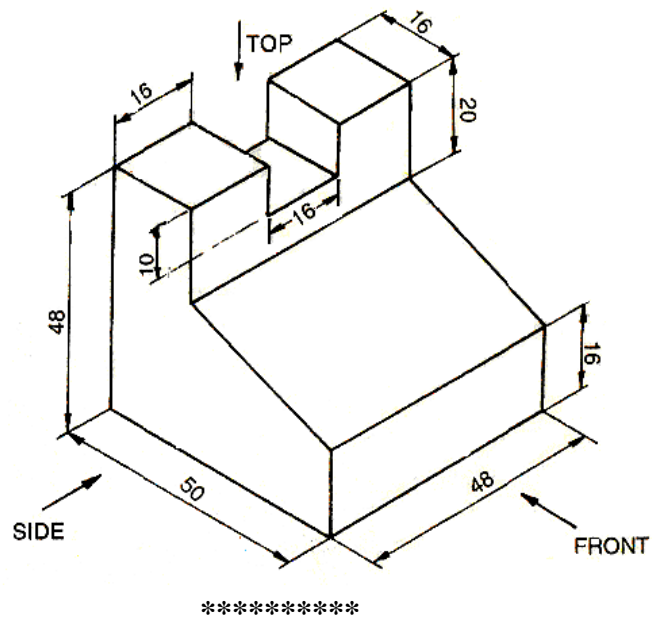
**Time: 2 hours****Max. Marks: 70**

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

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- 1 The major axis of an ellipse is 150 mm long and the minor axis is 100 mm long. Find the foci and draw the ellipse .Draw a tangent to the ellipse at a point 25mm above the major axis
- 2 A circle of 30 mm diameter rolls on circumference of another circle of 125mm diameter and outside it; trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw tangent and a normal to the curve at any point from the center of the directing circle.
- 3 Draw the projections of a straight line PQ when it is inclined at an angle of  $30^{\circ}$  to HP and  $45^{\circ}$  to VP. The length of the straight line is 90 mm and the end P is 20 mm above HP and 10 mm in front of VP.
- 4 The midpoint of a straight line AB is 60mm above HP and 50mm in front of VP. The line measures 80mm long and inclined at  $30^{\circ}$  to HP and  $45^{\circ}$  to VP. Draw its projections
- 5 Draw the projections of a regular pentagon plane of 25mm side, with its surface making an angle of  $45^{\circ}$  with HP. One of the sides of the pentagon is parallel to HP and 15 mm away from it.
- 6 A cylinder of 30 mm base diameter and 60 mm axis rests on HP with a point of its base such that the axis is inclined at  $30^{\circ}$  to HP. Draw its projections.
- 7 A sphere with a 50 mm diameter rests centrally over a cube with a 60 mm side. Draw its isometric projection.

- 8 Draw top, front and side views of the isometric projection given in figure All dimensions are in mm.



**Code No: R17A0012****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.TechII Semester Supplementary Examinations, October/November 2020****Engineering Physics-II****(Common to all branches)**

<b>Roll No</b>										
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**Time: 2 hours****Max. Marks: 70**

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

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- 1 (a) Derive an expression for cohesive energy between two atoms.  
(b) What are primary bounds? Explain in detail.
- 2 (a) Derive an expression for inter planar distance in cubic crystal.  
(b) In detail explain the forces between atoms.
- 3 (a) Derive an equation of Bragg's law.  
(b) Explain Burger's vector.
- 4 (a) Write a note on point defects.  
(b) Describe Laue's method of X-ray diffraction.
- 5 Drive an expression for Electronic polarizability.
- 6 (a) What is Ferro electricity? Explain its properties.  
(b) What are applications of dielectric materials?
- 7 Write a note on Dia, Para, Ferro, Anti-ferro and Ferri magnetic materials.
- 8 (a) What is Quantum confinement? Discuss in detail.  
(b) Illustrate are the applications of Nano materials?

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Code No: **R17A0014****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, October/November 2020****Environmental Studies**(Common to **EEE, ECE, CSE & IT**)

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 70**Answer Any **Four** Questions

All Questions carries equal marks.

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- 1 a. Differentiate Ecology and Eco-System. Explain the Food Chains, Food Webs and Ecological Pyramids of an eco-system with Suitable examples.
- b. Define Bioaccumulation and Bio magnification.
- 2 a. Explain the Nitrogen cycle with a neat diagram.
- b. Discuss Producers, Consumers and Decomposers of Eco-system.
- 3 a. Classify the Resources. Discuss the advantages and limitations of Dams.
- b. Non-renewable resources are major contributors of Environmental Pollution – Justify with your answer.
- 4 a. Define Deforestation. How deforestation leads to desertification – Explain in your Words with examples.
- b. Write a detailed note on renewable energy resources and its role in reducing the pollution levels.
- 5 Define Biodiversity. Explain the consumptive, social, productive, ethical, aesthetic and optional use values of bio-diversity.
- 6 a. What is meant by Hot-spot? Elaborate the two important hot-spots of India.
- b. Discuss the major Threats for loss of Biodiversity.
- 7 Write a brief note on following  
Green House Effects  
Climate change and its impacts  
Types of Pollutions
- 8 a. Explain the role of Environment Management Plan in EIA preparation report.
- b. Define Sustainable Development. Write a note on causes and threats of Sustainable Development.

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Code No: R17A0022

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, October/November 2020****Mathematics-II****(Common to all branches)**

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 70**Answer Any **Four** Questions

All Questions carries equal marks.

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- 1 a) Find a real root of the equation  $2x - \log x = 7$  by Rugula-falsi method.  
 b) Prove that  $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{\left(1 + \frac{\delta^2}{4}\right)}$
- 2 a) Derive a working formula to find cube root of a number and using it calculate cube root of 136.  
 b) Fit the interpolation polynomial for the following data

x	0	1	4	5
f(x)	4	3	24	39

- 3 a) Fit a second degree polynomial to the following data by method of least squares:

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

- b) Use Runge-Kutta fourth order method to find  $y(0.4)$  given  $y(0) = 1$  and

$$\frac{dy}{dx} = \frac{y-x}{y+x} \quad \text{taking } h = 0.2$$

- 4 a) Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  by using a) Trapezoidal rule b) Simpson's 1/3 rd rule

- b) Fit a curve of the form  $y = ae^{bx}$  to the data

x	0	1	2	3
y	1.05	2.10	3.85	8.30

- 5 a) Find the Fourier series of the periodic function as defined as

$$f(x) = \begin{cases} -\pi & \text{in } -\pi < x < 0 \\ x & \text{in } 0 < x < \pi \end{cases}$$

Hence deduce that  $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$

- b) Find the Fourier sine series for  $f(x) = 2x - x^2$  in  $0 < x < 3$  and  $f(x+3)=f(x)$ .
- 6 a) Find the Fourier series expansion for function  $f(x) = |\cos x|$ ,  $-\pi < x < \pi$
- b) Find the half range sine series for  $f(x) = ax + b$ , in  $0 < x < 1$
- 7 a) Solve  $x^2(y - z)p + y^2(z - x)q = z^2(x - y)$
- b) Solve  $x^2p^2 + y^2q^2 = z^2$
- 8 a) Find Inverse Laplace transform of  $\frac{s}{(s^2+a^2)^2}$ , using Convolution theorem.
- b) Solve  $(D^2 + 1)y = 6\cos 2t$ ,  $t > 0$ ,  $y(0) = 3$ ,  $y'(0) = 1$ , using Laplace transform.

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Code No: **R17A0502****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Supplementary Examinations, October/November 2020****Object Oriented Programming Through C++****(Common to all branches)**

<b>Roll No</b>										
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**Time: 2 hours****Max. Marks: 70**Answer Any **Four** Questions

All Questions carries equal marks.

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- 1 Define Object-Oriented Programming Paradigm. Discuss the features of OO paradigm in details and how C++ an OOP language implements the same.
- 2
  - a) Write a C++ program to implement switch statement.
  - b) Classify the basic data types into various categories and explain it.
- 3
  - a) To find the Area of Circle, Square and Triangle, implement a function overloading concept by writing a C++ program
  - b) Develop a program to calculate cube of a given variable using inline function and return the result by reference.
- 4
  - a) We have 5 students in a class and we have to input the name, rollno and mark of all the 5 students. Then create 5 different objects and then input the name and marks of all those 5 students. Design a program to display the details of all the students using array of object.
  - b) List out the characteristics of friend function.
- 5 Define Constructor. Summarize the various types of constructors with an example.
- 6
  - a) Illustrate the various access modes and their roles in inheritance with example.
  - b) Contrast the function overloading and function overriding.
- 7
  - a) Define polymorphism. Differentiate runtime polymorphism and compile time polymorphism.
  - b) Demonstrate the use of new operator and delete operator with an example.
- 8 Outline the various ways of handling exceptions? Identify when do we use multi-catch handlers? Justify with an example.

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