

Code No: **R15A0013****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, February 2021**Engineering Chemistry****(ME & AE)**

Roll No										
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Time: 2 hours 30 min**Max. Marks: 75**Answer Any **Five** Questions
All Questions carries equal marks.

- 1 a) Define the specific, equivalent, molar conductance and their units and applications of conductance? [7M]
- b) What are conductometric titrations? And explain the strong acid and weak acid with verses strong base with graphs? [8M]
- 2 a) Briefly explain the different types of fuel cell with construction, advantages and applications. [7M]
- b) What is electrochemical cell? Explain the Daniel cell cell. (3M) [8M]
- 3 What is cathodic protection? Explain how metals are protected by sacrificial anodic protection and impressed current cathodic protection. [15M]
- 4 a) Write short notes on electroless plating? Explain the role of hot dipping, nickel (Ni) and copper (Cu) electroplating with its applications and advantages? [7M]
- b) Write is the differences between electroplating and electroless plating? [8M]
- 5 What are the characteristics of good refractories? Derive the classification of refractories with examples and applications of refractories. [15M]
- 6 a) Briefly explain the conducting polymers and polyacetylene mechanism of conduction, doping; applications of conducting polymers [7M]
- b) What are the applications of nanomaterials? [8M]
- 7 Explain the external treatment processes: i) Zeolite process ii) Ion exchange process [15M]
- 8 a) What are the fuel and good fuel? Explain the characteristics of a good fuel. [7M]
- b) Explain briefly the liquid fuels of petroleum and its refining? [8M]

Code No: R15A0201

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, February 2021

Electrical Circuits

(ECE, CSE & IT)

Roll No									
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Time: 2 hours 30 min

Max. Marks: 75

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

- 1a) State and explain Kirchoff's voltage and current law with an example. [8M]
- 1 b) For the circuit shown in Fig. 1, determine the voltage across each current source. [7M]

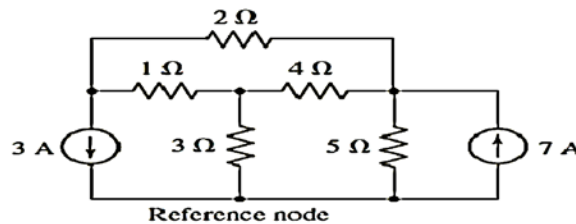


Fig. 1

- 2 a) Give details for source transformation technique with an example. [10M]
- 2 b) Determine the power absorbed by the 15Ω resistor in the circuit given in Fig. 2. [5M]

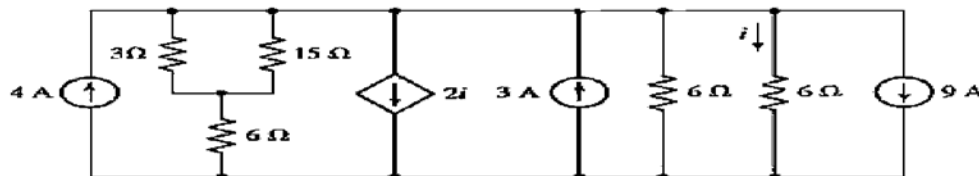


Fig. 2

- 3 a) Obtain the star connected equivalent circuit of the delta connected circuit. [8M]
- 3b) Obtain the delta connected equivalent for the star connected circuit shown in Fig. 3. [7M]

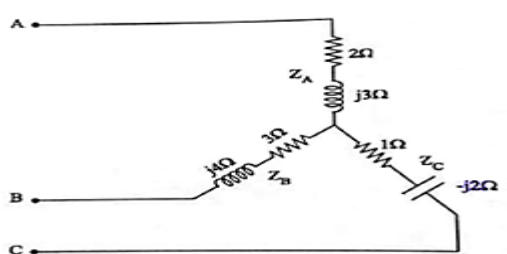


Fig. 3

- 4 Find the voltage $V(t)$ in the network shown in Fig. 4 using nodal technique. All impedances are in ohms. [15M]

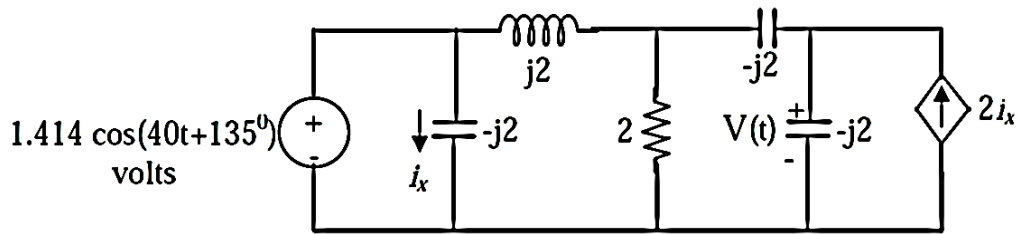


Fig. 4

- 5 In a series RLC circuit, $R=6$ ohms, $L=1$ H, $C=1$ F. A DC voltage of 40 V is applied at $t = 0$. Obtain the expression for $i(t)$ using differential equation approach. Explain the procedure to evaluate conditions. [15M]
- 6 a) Derive the expression for $i(t)$ and voltage across capacitor $V_C(t)$ for series R-C circuit with D.C voltage applied to it at $t = 0$. [8M]
- 6 b) Using Laplace Transform, solve for the current $i(t)$ in the RLC circuit given in Fig. 5. The capacitor is initially charged to a voltage of 2V. [7M]

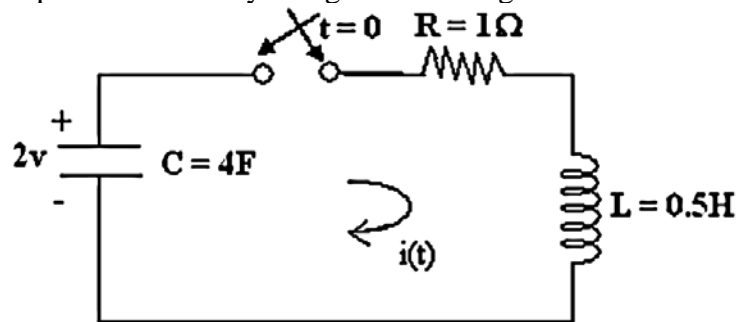


Fig. 5

- 7 a) Find the voltage across $-j20 \Omega$ capacitor using superposition theorem in below Fig. 7. All impedance values are in ohms. [7M]

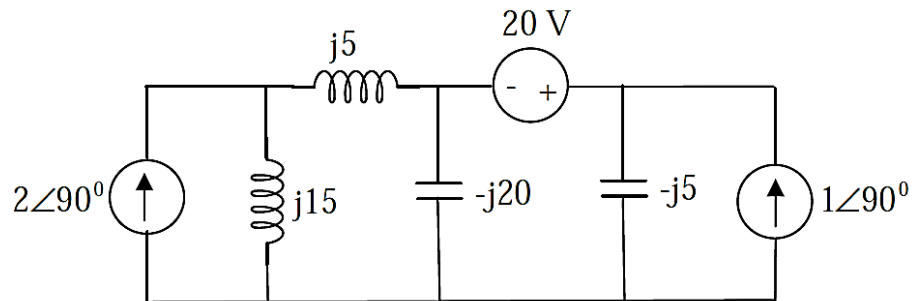


Fig. 7

- 7 b) Prove that the power transfer to the load becomes maximum when the load impedance is equal to the complex conjugate of the Thevenin's impedance. [8M]
- 8a) Enumerate the various losses in a transformer. How these losses can be minimised? [8M]
- 8b) Explain the short circuit test and open circuit test on transformer. Why these tests are to be performed? [7M]

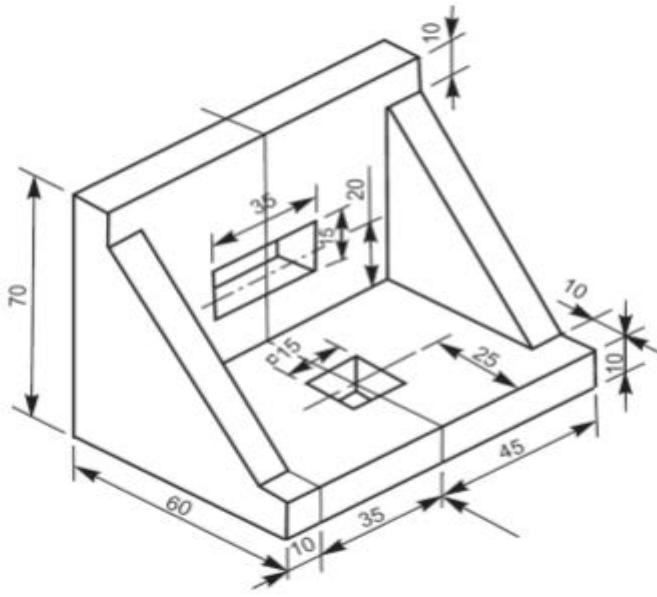
Code No: R15A0302**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.Tech II Semester Supplementary Examinations, February 2021****Engineering Drawing****(ME & AE)**

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Time: 2 hours 30 min**Max. Marks: 75**Answer Any **Five** Questions

All Questions carries equal marks.

- 1** The major axis of an ellipse is 150mm long and the minor axis is 100mm long. Find the foci and draw an ellipse by 'arcs of circles method'. Draw a tangent to the ellipse at a point on it 25mm above the major axis. **[15M]**
- 2** Draw a hypocycloid of a circle of 40 mm diameter which rolls inside another circle of 200 mm diameter for one revolution. Draw a tangent and normal at any point on it. **[15M]**
- 3** (a). Draw the projection of the following points along a common reference line. (i) Point A 20mm below HP and 25mm behind VP. **[7M]**
(ii) Point B 25mm away from the reference planes and is in IV quadrant.
(iii) Point C 20mm above HP and the same distance behind VP. (7M)
(b). A line CD length 80 mm is inclined at 30° to HP and 45° to VP. The mid point of line M is 40 mm above HP and 60 mm in front of VP. Draw the projections of the line **[8M]**
- 4** A line CD of length 80 mm is inclined at 30° to HP and 45° to VP. The end C is 20 mm above HP and end D is 30 mm in front of VP. Draw the projections of the line **[15M]**
- 5** Draw the projections of a circle of 40 mm diameter when its plane is equally inclined to HP and VP. One end of a diameter of the circle touches the HP while the other end touches the VP. **[15M]**
- 6** A hexagonal prism of 30 mm base edges and axis 70 mm long rests on one of its corners of the base on HP. Draw its projections, when lateral edge through that corner on HP is inclined at 30° to HP. And the vertical plane containing that lateral edge axis is parallel to VP. **[15M]**
- 7** Draw the isometric projections of a sphere of 40 mm diameter resting centrally on the top of square prism of base 50 mm sides and height 80 mm **[15M]**
- 8** Draw the following orthographic views of an object shown in the pictorial projection. (All dimensions are in mm) (i) Front view (ii) Top view and (iii) Side view **[15M]**



Code No: **R15A0012****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

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I B.Tech II Semester Supplementary Examinations, February 2021**Engineering Physics-II****(Common to all branches)**

Roll No										
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Time: 2 hours 30 min**Max. Marks: 75**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 Plot and explain the variation of (i) attractive potential energy (ii) repulsive potential energy (iii) resultant potential energy with interatomic distance, when two atoms are brought near [15M]
- 2 (a) Derive an expression for inter planar distance in cubic crystal [11M]
[4M]
(b) Sketch the crystal planes of Miller indices (001), (100), (111), (110)
- 3 Explain the principle, procedure and advantage of Debye-Scherrer (powder) method of X-ray diffraction [15M]
- 4 Derive an expression for Schottky defects concentration in case of ionic crystals [15M]
- 5 Discuss and derive an expression for internal field in dielectrics [15M]
- 6 What is piezoelectric method in ultrasonics? Describe with a neat diagram about the generation of ultrasonic wave by piezoelectric method. [15M]
- 7 Classify the properties of dia, para, Ferro, Anti Ferro, Ferri magnetic materials [15M]
- 8 (a). Discuss in detail the applications of nano materials in various fields [7M]
[8M]
(b). Explain in detail about the characterisation of nano particles by using SEM

Code No: R15A0022

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, February 2021**Mathematics-II****(Common to all branches)**

Roll No									
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Time: 2 hours 30 min**Max. Marks: 75**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 a) Find the real root of $x^3 - 4x - 9 = 0$, using false position method. [7M]
 b) Find the real root of $x^3 - 3x + 1 = 0$, using Newton-Raphson method. [8M]
- 2 a) Using Newton's forward formula, find the value of 'y' if $x = 1.6$ [7M]
 x: 1 1.4 1.8 2.2
 y: 3.49 4.82 5.96 6.5
- b) Estimate the value of 'y' at $x = 42$ from the following data: [8M]
 x: 20 25 30 35 40 45
 y: 354 332 291 260 231 204
- 3 Evaluate $\int_0^1 \frac{dx}{1+x}$ using (i) Trapezoidal rule (ii) Simpson's 1/3rd rule. [15M]
- 4 a) Obtain Picard' approximate solution for the differential equation $\frac{dy}{dx} = -xy$ [7M]
 with $x_0 = 0, y_0 = 1$.
- b) Fit a straight line to the following data: [8M]
 x: 1 1.5 2 2.5 3 3.5 4
 y: 1.1 1.3 1.6 2 2.7 3.4 4.1
- 5 Find a Fourier series to represent x^2 in the interval $(-\pi, \pi)$. [15M]
- 6 Express $f(x) = x$ as a half-range sine and cosine series in $0 < x < 2$. [15M]
- 7 Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$. [15M]
- 8 Using Green's theorem, evaluate $\int_C [(xy + y^2)dx + x^2dy]$, where C is bounded by [15M]
 the curves $y = x$ and $y = x^2$.

Code No: R15A0502

R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, February 2021

Object Oriented Programming

(Common to all branches)

Roll No										
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Time: 2 hours 30 min

Max. Marks: 75

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

- 1 Explain the different types of data types used in C++ .Explain with an examples? [15M]
- 2 Compare and contrast procedure oriented programming and object oriented Programming? [15M]
- 3 Write a C++ program to generate Fibonacci series using recursion with member function [15M]
- 4 What are classes? Create a class with the following data members? Name of the class: [15M]
Vehicle, Data members: name, model, company, Price, and variants, Member functions: putdetails() and getdetails() to set and display Vehicle details respectively?
- 5 What is constructor? Differentiate among constructors, copy initialization and copy constructors [15M]
- 6 Explain about virtual destructors? [15M]
- 7 Write a C++ program illustrating the use of NEW and DELETE operators? [15M]
- 8 Discuss about the importance of try, catch and throw keywords. [15M]
