

Code No: R15A0013**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.TechII Semester Supplementary Examinations, October/November 2020****Engineering Chemistry****(ME & AE)**

Roll No										
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Time: 2 hours**Max. Marks: 75**

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

- 1 a) What are the types of Electrodes. Explain construction and functioning of calomel, quinhydrone and glass electrodes?
- 2 a) Define EMF and electrode potential? Derive the Nernst equation and give its applications?
b) What is hydrogen-oxygen fuel cell construction? And its functioning, advantages and applications.
- 3 a) What is the electro chemical corrosion? Explain the mechanism of evolution of hydrogen?
b) Briefly explain the galvanic corrosion and factors affecting rate of corrosion of nature of metal?
- 4 a) Write a brief note on galvanization & tinning
b) What are the applications and advantages of electroless plating?
- 5 What are the characteristics of good refractories? Give the classification of refractories with examples and applications of refractories.
- 6 Define the characteristics and classification of a good lubricant with examples and their properties of lubricants.
- 7 a) Explain the treatment of boiler feed water with internal treatment.
b) Determination of hardness of water by EDTA method?
- 8 a) What are the types of cracking and fixed bed catalytic cracking. Explain the Fischer-Tropsch's process?
b) Define the fuel and good fuel? Explain the characteristics of a good fuel.

Code No: R15A0201

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

I B.TechII Semester Supplementary Examinations, October/November 2020

Electrical Circuits
(ECE, CSE & IT)

Roll No									
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Time: 2 hours

Max. Marks: 75

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

- 1 a) Differentiate between independent and dependent sources and draw their circuit representation.
- 1 b) State and Explain Ohm's law and Kirchoff's law
- 2 Determine the current delivered by the source in the circuit shown in Fig. 2.

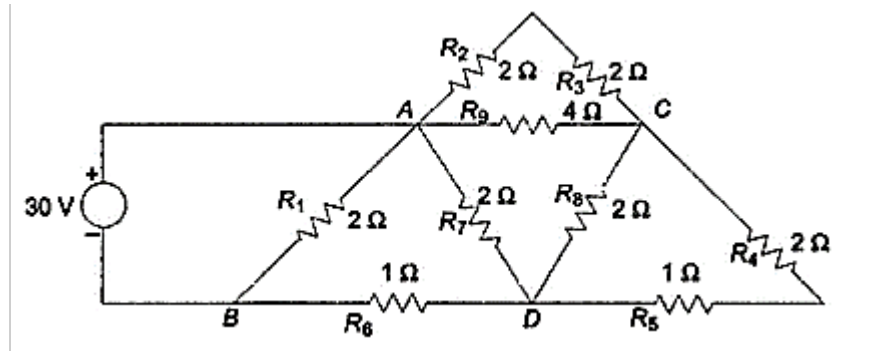


Fig. 2.

- 3 Explain about the incidence matrix and triset matrix in detail.
- 4 Using mesh analysis, determine the voltage V_s which gives a voltage of 50V across the 10Ω resistor as shown in Fig. 4.

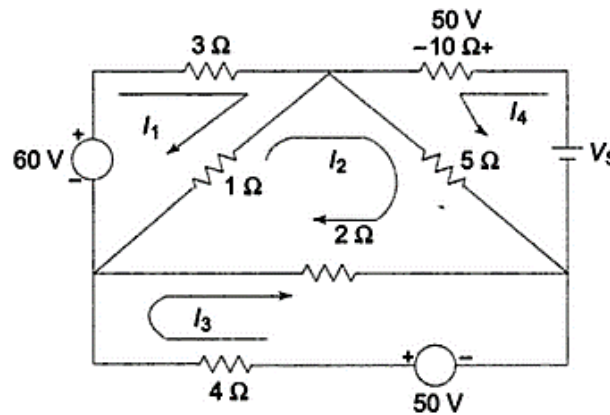


Fig. 4.

- 5 For a series resonant circuit with constant voltage and variable frequency, obtain the frequency at which voltage across the inductor is maximum. Calculate this

maximum voltage when $R=50$ ohms, $L=0.05H$, $C=20$ micro farad and $V=100$ volts.

- 6 A series R-C circuit with $R=10$ ohms and $C= 2F$ has a sinusoidal voltage source $200 \sin(500t + \phi)$ applied at time when $\phi = 0$. (i) Find the expression for current (ii) At what value of ϕ must the switch be closed so that the current directly enter steady state.
- 7 State Maximum power transfer Theorem. For the circuit shown in Fig. 7 determine the value of R_L to get the maximum power. Also find the maximum power transferred to the load.

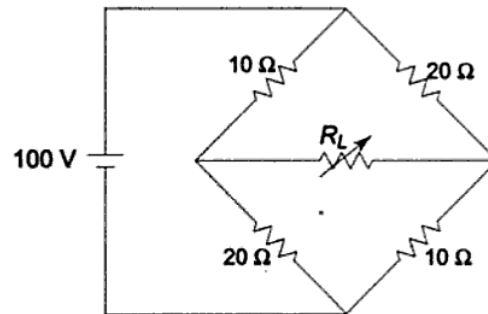


Fig. 7

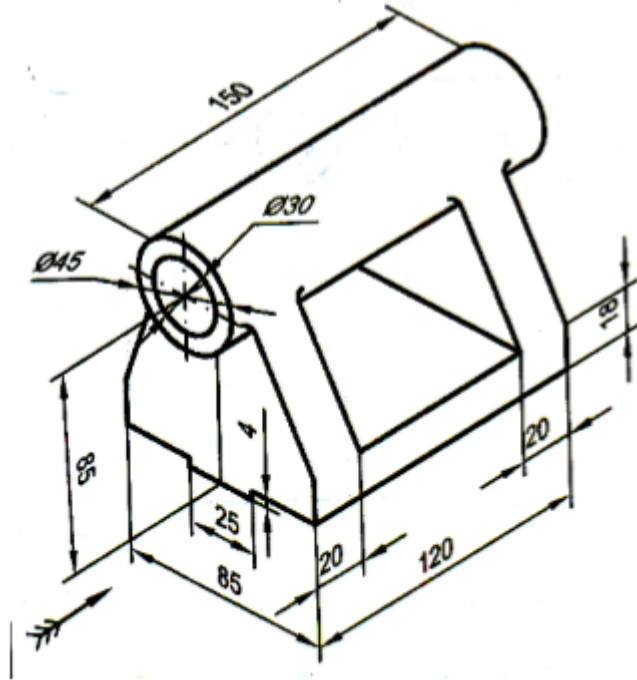
- 8 A 4 kVA, 200/400 V, 50 Hz, single phase transformer has equivalent resistance referred to primary as 0.15Ω . Calculate,
- The total copper losses on full load
 - The efficiency while supplying full load at 0.9 p.f lagging
 - The efficiency while supplying half load at 0.8 p.f. leading.
- Assume total iron losses equal to 60 W.

Code No: **R15A0302****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**
(Autonomous Institution – UGC, Govt. of India)**I B.TechII Semester Supplementary Examinations, October/November 2020****Engineering Drawing****(ME & AE)**

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

- 1 (a) Construct a regular heptagon with a side of 30mm by general method (7M)
(b) The foci of an ellipse are 90mm apart and the minor axis is 72mm long. Determine the length of the major axis. Construct the ellipse and draw the tangent from any point outside the ellipse
- 2 (a) Construct a regular Octagon with a side of 30mm by general method (7M)
(b) Construct an ellipse with a distance of focus from directrix as 50 mm and eccentricity as $\frac{2}{3}$. In addition draw the tangent and normal to a curve at a point 40 mm from directrix
- 3 (a) A point A is 20mm above HP and in the first quadrant. Its shortest distance from the reference line XY is 40mm. Draw the projections of the point and determine its distance from VP.
(b) A line EF 60mm long is in VP and inclined to HP. The top view measures 45mm. The end E is 15mm above HP. Draw the projections and find the inclinations with HP.
- 4 The projectors of the ends of a line AB are 60mm apart. The end A is 20mm above the HP and 30mm in front of the VP. The end B is 10mm below the HP and 40mm behind the VP. Determine the true length and traces of AB, and its inclinations with the two planes.
- 5 A thin rectangular cord board lamina has one of its corners on the HP and the surface makes 60° with HP. Draw the projections when the top view of the diagonal passing through the corner on HP, makes 45° with the reference line. The size of the lamina is 50X25 mm
- 6 A pentagonal pyramid of base edges 30 mm and axis 70 mm long has a corner of base on HP. Draw its projections when the slant edge through corner lies on HP and is parallel to VP
- 7 Draw the isometric projection of the frustum of a hexagonal pyramid of base edges 20 mm sides and top edges 8 mm sides and axis 55 mm long when its base on HP. Two of the base edges are parallel to the VP.
- 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



Code No: **R15A0012****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)**

Roll No										
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Time: 2 hours**Max. Marks: 75**

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

- 1 What is cohesive energy? Assuming a suitable model for interatomic forces derive an expression for cohesive energy
- 2 Show that FCC crystals are closely packed than SC and BCC structures
- 3 Derive Bragg's law of X-ray diffraction?
- 4 Distinguish between Frenkel defects & Schottky defects
- 5 Derive an expression for electronic polarization in case of dielectric materials
- 6 Explain how are the ultrasonic waves are produced by magnetostriction method
- 7 Distinguish between Type-I & Type-II superconductors
- 8 Describe the process of "sol-gel" in the fabrication of nano materials

Code No: R15A0022

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

I B.TechII Semester Supplementary Examinations, October/November 2020

Mathematics-II

(Common to all branches)

Roll No										
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Time: 2 hours

Max. Marks: 75

Answer Any **Four** Questions

All Questions carries equal marks.

- 1 a) Find a root of the equation $x^3 - 4x - 9 = 0$, using the Bisection method.
 b) Find the positive root of $x^4 - x = 10$, using Newton-Raphson method.
- 2 a) The table gives the distances in nautical miles of the visible horizon for the given heights in feet above the earth's surface:
- | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|-------|-------|
| x(height): | 100 | 150 | 200 | 250 | 300 | 350 | 400 |
| y(distance): | 10.63 | 13.03 | 15.04 | 16.81 | 18.42 | 19.90 | 21.27 |
- Find the value of 'y' when $x = 218$ ft.
- b) Given the values
- | | | | | | |
|----|-----|-----|------|------|------|
| x: | 5 | 7 | 11 | 13 | 17 |
| y: | 150 | 392 | 1492 | 2366 | 5202 |
- Find the value of 'y' when $x = 9$ using Lagrange's formula.
- 3 Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using (i) Trapezoidal rule taking $h=1/4$ and
 (ii) Simpson's $1/3^{\text{rd}}$ rule taking $h=1/4$.
- 4 a) Find by Taylor's series method the value of y at $x=0.1$ to three places of decimals from $\frac{dy}{dx} = x^2 y - 1$, $y(0) = 1$.
- b) Fit a straight line that best fits the following data:
- | | | | | | |
|----|----|----|----|----|----|
| x: | 1 | 2 | 3 | 4 | 5 |
| y: | 14 | 27 | 40 | 55 | 68 |
- 5 If $f(x) = |\cos x|$, expand $f(x)$ as a Fourier series in the interval $(-\pi, \pi)$.
- 6 Expand $f(x) = e^{-x}$ as a Fourier Series in the interval $(-l, l)$.
- 7 Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.
- 8 a) Find the directional derivative of $\phi = x^2 yz + 4xz^2$ at the point $(1, -2, 1)$ in the direction of the vector $2\mathbf{i} - \mathbf{j} - 2\mathbf{k}$.
- b) Show that $\text{div}(\text{grad } r^m) = m(m+1)r^{m-2}$, where $r = |\mathbf{r}|$, $\mathbf{r} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$

Code No: R15A0502**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.TechII Semester Supplementary Examinations, October/November 2020****Object Oriented Programming****(Common to all branches)**

Roll No										
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Time: 2 hours**Max. Marks: 75**

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

- 1 Explain the member functions of ISTREAM class with an example
- 2 Differentiate among Pass by value, pass by reference and pass by address with the help of a suitable program?
- 3 Describe the read and write functions, their prototype, use and the way input and output data?
- 4 Write a recursive program for finding the GCD between two numbers.
- 5 Write a C++ Program for Dynamic Initialization using constructors
- 6 What is virtual base class? Write a C++ program illustrating virtual base Classes?
- 7 Describe the three different inheritance behaviors achieved through the use of pure virtual, ordinary virtual and non virtual functions?
- 8 Write a program containing a possible exception. Use a try block to throw it and a catch block to handle it properly?
