

Code No: **R17A0012****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.Tech II Semester Supplementary Examinations, July 2021****Engineering Physics-II
(Common to all branches)**

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Time: 3 hours**Max. Marks: 70**

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

- 1 a) Explain the forces between the two interacting atoms when they are brought nearer to form a molecule. **(10M)**
b) Write the differences between primary and secondary bonds. **(4M)**
- 2 a) Define Miller indices of a crystal plane and write its important features. **(7M)**
b) Describe the FCC crystal structure. **(7M)**
3. a) Describe with suitable diagram, the powder method of determination of crystal Structure. **(10M)**
b) Calculate the glancing angle of (101) plane of a cubic crystal having axial length 0.25nm corresponding to the second order diffraction maximum for the X-rays of wavelength 0.078 nm. **(4M)**
- 4 a) Write the differences between edge and screw dislocations. **(4M)**
b) Derive an expression for concentration of Schottky defect in an ionic crystal. **(10M)**
- 5 a) Explain the electronic polarizability in atoms and obtain an expression for electronic Polarizability in terms of the radius of the atom. **(12M)**
b) Define the terms (i) Dipole momentum (ii) polarizability? **(2M)**
- 6 a) Write the applications of dielectric materials. **(6M)**
b) Explain Clausius- Mosotti relation in dielectrics subjected to static fields. **(8M)**
- 7 a) Derive the expression for Bhor magnetron. **(8M)**
b) Write the difference between ferri and anti ferro magnetism. **(6M)**
- 8 a) Describe the processes of “PVD” in the fabrication of nano-structures. **(7M)**
b) Write the applications of nanotechnology. **(7M)**

Code No: R17A0022

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, July 2021

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.

1 a) Find a positive root of the equation by iteration method: $3x = \cos x + 1$ **[8M]**

b) Find a real root of $x^3 - 5x + 3 = 0$ using Bisection method. **[6M]**

2 a) The following are the measurements T made on a curve recorded by the oscillograph representing a change of current I due to a change in the conditions of an electric current. **[10M]**

T	1.2	2.0	2.5	3.0
I	1.36	0.58	0.34	0.20

Using Lagrange's formula, find I at $T = 1.6$.

b) Prove that $E = e^{hD}$ **[4M]**

3 Obtain a relation of the form $y = ab^x$ for the following data by the method of least squares **[14M]**

X	2	3	4	5	6
Y	8.3	15.4	33.1	65.2	127.4

4 Evaluate $\int_0^6 \frac{dx}{1+x}$ by using (i) Trapezoidal rule (ii) Simpson's 1/3rd rule and (iii) Simpson's 3/8th rule. **[14M]**

5 Obtain the Fourier series for the function $f(x) = x \sin x$ in $[-\pi, \pi]$ **[14M]**
Hence deduce that
$$\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots = \frac{1}{4}(\pi - 2)$$

6 Find the Fourier series for $f(x) = x + x^2$ in $0 < x < 3$ **[14M]**

7a) Find the differential equation arising from $f(x + y + z, x^2 + y^2 + z^2) = 0$ **[7M]**

b) solve $px + qy = pq$ **[7M]**

8 a) Apply convolution theorem to evaluate: $L^{-1} \left[\frac{s^2}{(s^2 + 4)^2} \right]$ **[10M]**

b) Find the Laplace transform of $\frac{\sin 2t}{t}$ **[4M]**

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

(Autonomous Institution – UGC, Govt. of India)

I BI B.Tech II Semester Supplementary Examinations, July 2021**Object Oriented Programming Through C++****(Common to all branches)**

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Time: 3 hours**Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 List the benefits of OOP. Write briefly about C++ data types. [14M]
- 2 Explain about Friend Function and mention its rules with an example Program. [14M]
- 3 Explain the visibility of base class members for the access specifiers : private, protected and public while creating the derived class and also explain the syntax for creating derived class. [14M]
- 4 State Function overloading. Write a C++ program to define three overloaded functions to swap two integers, swap two floats and swap two doubles. [14M]
- 5 Differentiate constructor and destructor with suitable programs. Write a C++ program to demonstrate default constructor [14M]
- 6 Describe types of Inheritance with suitable examples. [14M]
- 7 Explain pointers in C++. Write a C++ program to demonstrate pointers with arrays. [14M]
- 8 What is the need of Exception Handling? Write a program using try block to detect and throw an exception if the condition “divide-by-zero” occurs. [14M]

Code No: R17A0201

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech II Semester Supplementary Examinations, July 2021

Electrical Circuits

(EEE, ECE, CSE & IT)

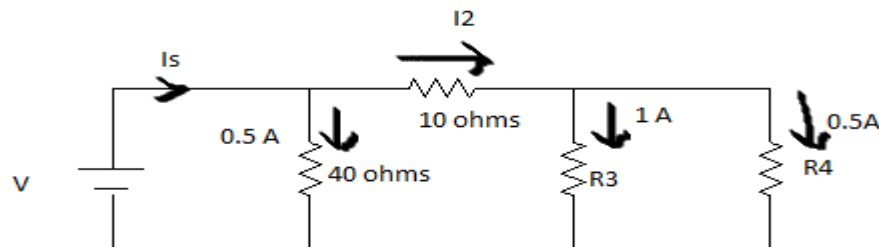
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Time: 3 hours

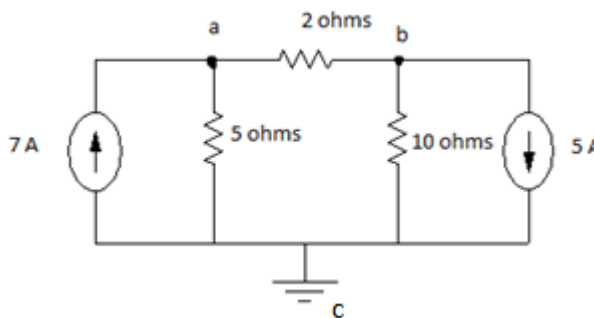
Max. Marks: 70

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

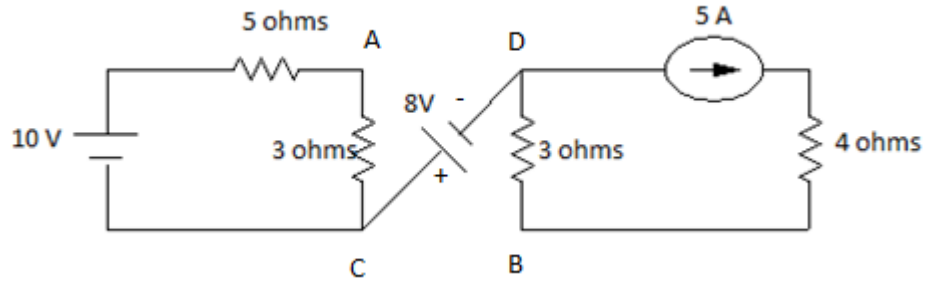
- 1 a)** Find the unknown currents in the different section of the circuit shown in fig below, using KCL .Also find the unknown voltages in each resistor and source **[7M]**



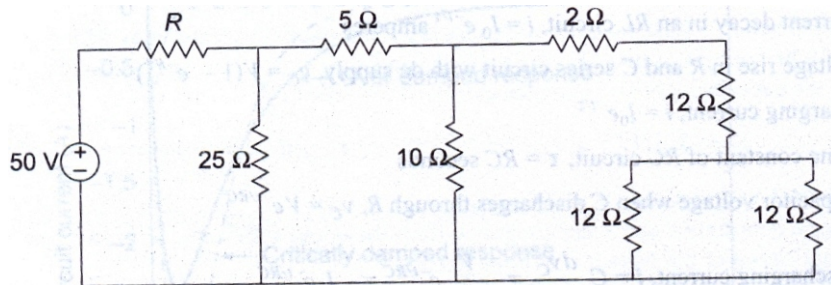
- b)** By using source transformation method from figure below find Voltage and Power across 2 ohms resistor. **[7M]**



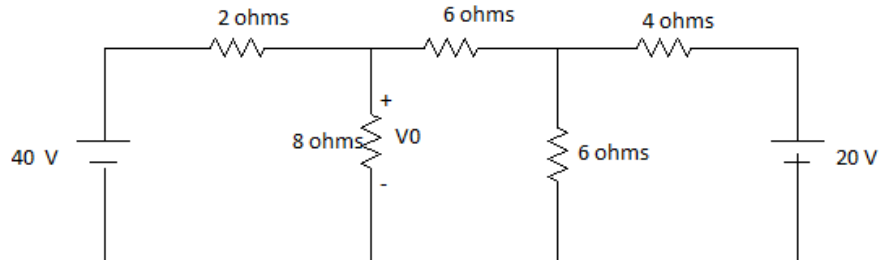
- 2 a)** Find the voltage of point A with respect to point B in the figure below. Is it positive with respect to B? **[7M]**



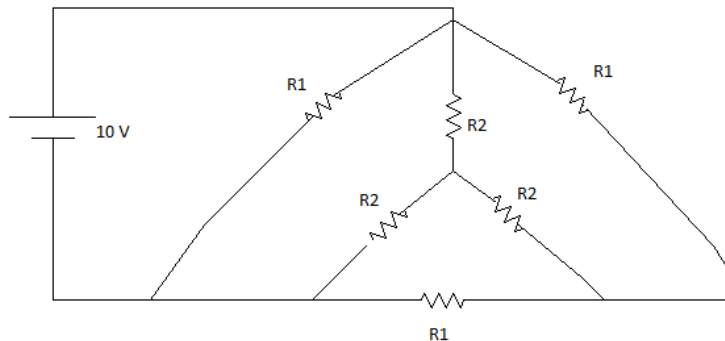
- b) For the circuit shown in Figure below the power consumed by the 25Ω resistor is 25 W . Find R . [7M]



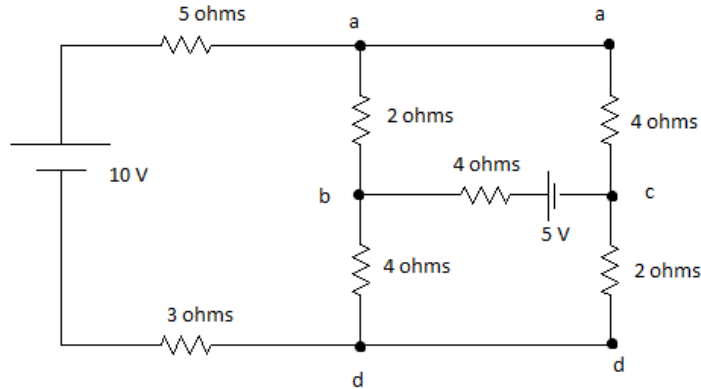
- 3 a) Use the mesh method to determine the power associated with each voltage source in the circuit shown in figure below , calculate the voltage V_0 across the 8Ω resistor? [7M]



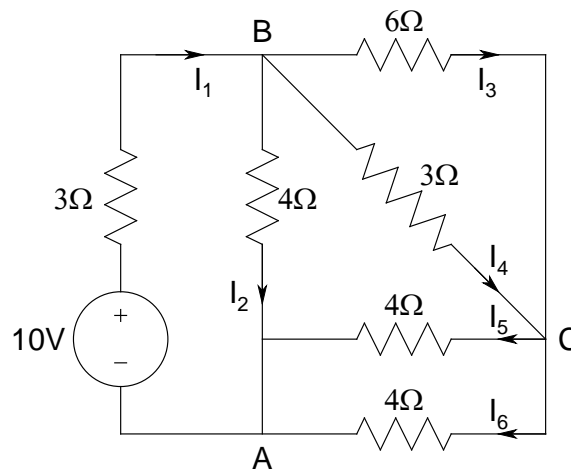
- b) Find the current drawn from the source and each resistor of figure below, Using star-delta transformation .Take $R_1 = 300 \text{ ohms}$ and $R_2 = 100 \text{ ohms}$. [7M]



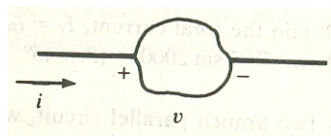
- 4 a) Find the current in 3 ohms resistor of Figure below .using node equation method . [7M]



- b) For the network shown below, draw the network graph. Write one possible tree and cutset schedule on the basis of tree branch voltages and determine all branch currents. [7M]



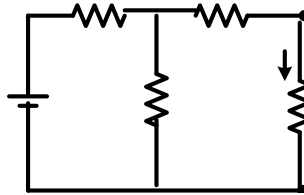
- 5 a) A series circuit consists of a non-inductive resistor of 10Ω an inductor having a reactance of 50Ω , and a capacitor having a reactance of 30Ω . It is connected to a 230-V ac supply. Calculate (i) the current and (ii) the voltage across each component. Draw to scale a phasor diagram showing the supply voltage and current and the voltage across each component. [7M]
- b) The circuit element in Figure shown below has a current $i=2.5 \cos (2500t-30^\circ)$ (A) and a voltage $v=5.0 \sin (2500t-30^\circ)$ (V). What is the element? [7M]



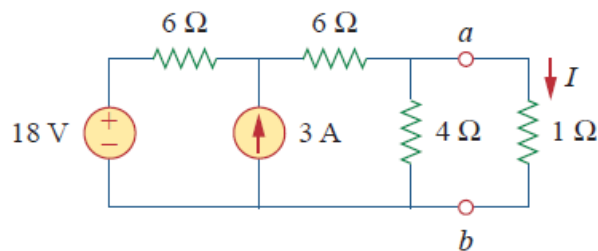
- 6 a) A coil having a resistance of 10Ω and an inductance of 0.2 H is connected [7M]

in series with a $100 \mu\text{F}$ capacitor across a 230- V, 50-Hz supply. Calculate (i) the active and reactive components of the current and (ii) the voltage across the coil. Sketch the phasor diagram

- b) 100 V AC at 50 Hz is applied across a coil having resistance R and inductance L . The current observed to be 10 A and when the same voltage is applied at 60 H frequency the current is measured to be 8 A. Find the resistance and inductance of the coil [7M]
- 7 a) Apply the Norton's theorem to the circuit shown below determine the current through 12Ω resistor [7M]



- b) Using Thevenin's Theorem, Find the equivalent circuit to the left of the terminals in the circuit of figure below. Then find I [7M]



- 8 a) An iron ring of mean circumference 1.0 mm is uniformly wound with 400 turns of wire. When a current of 1.2 A is passed through the coil, a flux density of 1.15 Wb/m^2 is produced in the iron .Find the relative permeability of iron under these circumstances. [7M]
- b) Two similar coils have a coupling coefficient of 0.2. When they are connected in series cumulatively, the total inductance is 120 mH. Calculate: (i) the self-inductance of each coil, (ii) the total inductance when the coils are connected in series differentially, and (iii) the total magnetic energy due to a current of 3 A when the coils are connected in series (a) cumulatively and (b) differentially. [7M]

Code No: R17A0013

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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

Roll No									
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Time: 3 hours**Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

- 1
 - a. With a neat diagram, describe the construction and functioning of calomel electrode. [7M]
 - b. Describe the construction and working of a hydrogen-oxygen fuel cell. [7M]
- 2
 - a. What is the principle underlying conductometric titration? Discuss the titration curve obtained in the case of a strong acid (HCl) with strong base (NaOH). [6M]
 - b. Derive the Nernst equation and discuss its applications. [8M]
- 3
 - a. Explain the electrochemical theory of corrosion of metals with a special reference to mechanism of rusting of iron in acidic medium. [10M]
 - b. Explain dry corrosion [4M]
- 4
 - a. Explain the process of galvanizing and tinning processes in hot dipping method with diagrams [8M]
 - b. Explain the process of Electroplating. Illustrate with an example. [6M]
- 5
 - a. Explain why natural rubber needs vulcanization. How is it carried out? [8M]
 - b. Explain the synthetic method of preparation, properties and applications of Buna-S rubber and Butyl rubber [6M]
- 6
 - a. Write the classification refractories with suitable examples. [3M]
 - b. Explain the characteristics of a good lubricant. [4M]
 - c. Describe the method of preparation, properties and applications of Nylon 6:6 and Dacron [7M]
- 7
 - a. Explain the following boiler troubles along with the preventive methods [9M]
 - i. Sludge and scale formation
 - ii. Caustic embrittlement
 - iii. Boiler corrosion
 - b. Explain the desalination of brackish water by reverse osmosis. [5M]
- 8
 - a. With a neat diagram, describe the fixed bed catalytic cracking process of obtaining gasoline. [7M]
 - b. Explain the synthesis of petrol by Fisher-Tropsch process with a neat diagram. [7M]

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

(Autonomous Institution – UGC, Govt. of India)

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

Roll No									
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Time: 3 hours**Max. Marks: 70**Answer Any **Five** Questions

All Questions carries equal marks.

- 1 Construct a conic when the distance between its focus and directrix is equal to 40 mm and its eccentricity is one. Draw a tangent a point on the upper half of the curve located 60 mm from the focus. [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 [14M]
 - (i) P is 20 mm above HP and 25 mm in front of VP
 - (ii) Q is 35 mm above HP and 20 mm behind VP
 - (iii) R is 20 mm below HP and 30 mm in front of VP
 - (iv) S is 30 mm below HP and 30 mm behind VP
 - (v) T is on both HP and VP
 - (vi) U is on HP and 25 mm behind VP
 - (vii) V is on VP and 20 mm above HP
- 4 A line LM 70 mm long has its end L 10mm above HP and 15 mm in front of VP. Its top view and front view measures 60 mm and 40 mm respectively. Draw the projections of the line and determine its inclinations with HP and VP. [14M]
- 5 Draw the projections of a circle of 50 mm diameter resting in the H.P. on a point A on the circumference, its plane inclined at 45^0 to the H.P. and the diameter AB making 30^0 angle with the V.P. [14M]
- 6 A square prism base 40 mm side and height 65 mm has its axis inclined at 45^0 to the HP. Draw its projections. [14M]
- 7 A hexagonal pyramid of base side 30mm and axis length 60mm is resting on HP on its base with a side of base parallel to VP. Draw the isometric view of the pyramid. [14M]

- 8 Draw the front view, top view and side view for the picture shown in figure in first angle projection. (All dimensions are in mm) [14M]

