| Hall Ticket Number : | | | | | | | | | | |
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**R-14**

**Code: 4G233**

II B.Tech. I Semester Supplementary Examinations October 2020

# Electrical Circuits-I

( Electrical and Electronics Engineering )

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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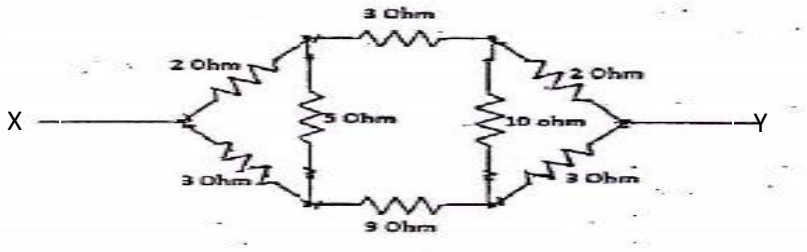
## UNIT–I

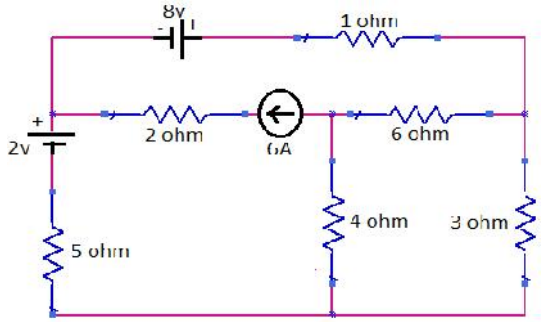
1. a) Discuss the V-I relationships for R,L and C parameters

   b) Determine the resistance between X-Y terminals for the network shown in fig.1

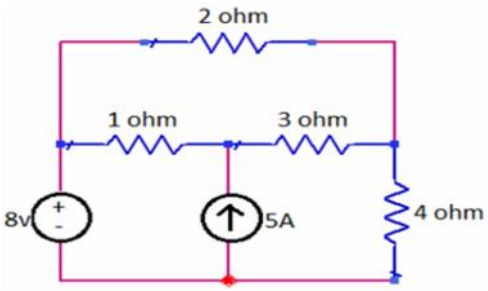



**OR**

2. a) Determine the mesh currents and determine the power delivered by 8V voltage source for the circuit shown in fig



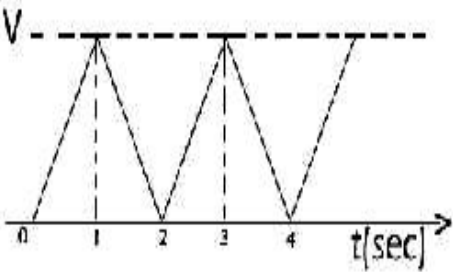

   b) Determine the node voltages and current through each resistor for the circuit shown in fig




## UNIT–II

3. a) Define the terms: i) Instantaneous value ii) Cycle iii)Time period iv) Frequency

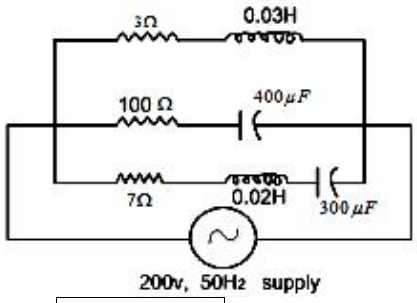
   b) Find R.M.S., Average value and the form factor for the wave shown in fig




**OR**

4. a) Define the terms: i) Resonance ii) Band Width
iii) Resonant Frequency iv) Q-factor

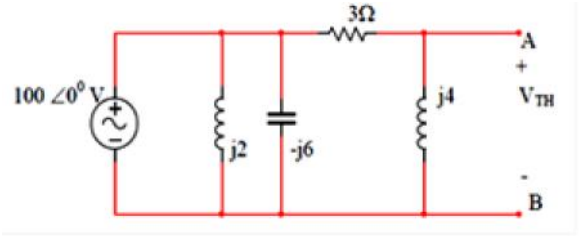
b) Find the current through each branch, total current and draw the vector diagram for the circuit shown in fig




**UNIT–III**

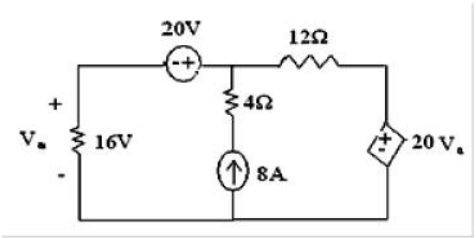
5. a) Derive the condition for maximum power transfer in DC circuits

b) Find the load impedance that draws maximum power and the amount of maximum power drawn for the circuit shown in figure.




**OR**

6. a) Find the voltage drop across16Ω resistor using super position theorem for the circuit shown in figure

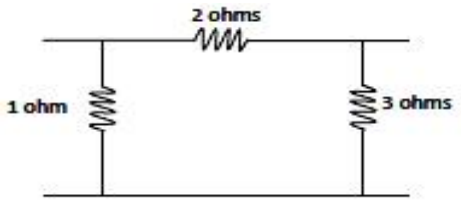



b) State and Explain compensation theorem

**UNIT–IV**

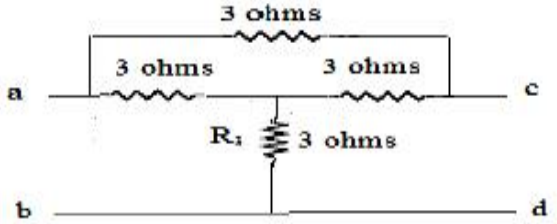
7. a) Obtain the relationship between Z and ABCD parameters.

b) Find the ABCD parameters of the network shown in fig




**OR**

8. a) Obtain the condition for symmetry and reciprocity for h-parameters
b) Find the Y-parameters for the network as shown in fig



**UNIT–V**

9. a) Define the terms:

i) Self inductance ii) Mutual inductance

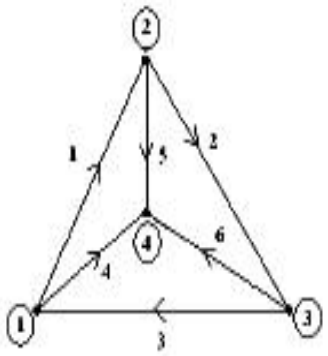
iii) Reluctance iv) Magneto Motive Force

b) Two coupled coils with $L_1$=0.02H, $L_2$=0.01H and k=0.5 are connected in four ways Series Aiding, Series Opposing, Parallel Aiding and Parallel Opposing. What are the four equivalent inductances?

**OR**

10. a) Define the terms: i) Graph ii) Tree iii) Link iv) Twig

b) Determine the Tieset and Cutset matrix for the graph shown in fig

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| Hall Ticket Number : | | | | | | | | | | |
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**R-14**

**Code: 4G234**

II B.Tech. I Semester Supplementary Examinations October 2020

# Electro Magnetic Fields

( Electrical and Electronics Engineering )

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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## UNIT–I

1. a) State and explain coulombs law of force between two charges? 7M

   b) The concentrated charges of 0.2μC are located at the vertices of an equilateral triangle of 10m of side. Find the magnitude and direction of the force on one charge due to other two charges? 7M

**OR**

2. a) State and explain Gauss law in Integral form. 7M

   b) Derive the equation for potential at a point inside a solid sphere having uniform charge density? 7M

## UNIT–II

3. a) Define Dipole and Dipole moment? Derive the expression for potential due to dipole? 7M

   b) Explain Polarization of dielectric materials? 7M

**OR**

4. a) Deduce the boundary conditions for dielectric to dielectric with tangential and normal component? 7M

   b) Derive the equation for capacitance of two parallel transmission lines. 7M

## UNIT–III

5. a) Obtain an expression for Magnetic field intensity due to an infinitely long current carrying conductor? 7M

   b) Derive the expression for Vector Magnetic Potential. 7M

**OR**

6. Using Ampere's circuital law find H due to an infinite sheet of current. 14M

## UNIT–IV

7. a) What is a magnetic dipole? How does it differ from an electric dipole? 7M

   b) Derive the expression for inductance of a solenoid using Amperes circuital law. 7M

**OR**

8. Explain the magnetization and demagnetization by using B-H curve with neat diagram. 14M

## UNIT–V

9. a) Distinguish clearly the dynamically induced EMF and statically induced EMF explain with neat diagram. 7M

   b) Find the EMF developed around a circular path with radius r=0.5m in the plane z=0 at t=0 if(i) B=0.1 sin(377t)$a_{z,}$(ii) B=0.1sin(377t/r)$a_{r.}$ 7M

**OR**

10. a) Derive the expression of one of the Maxwell's equation Curl(E)=$\frac{-\partial B}{\partial t}$. 7M

    b) Derive the equation for modified Amperes circuital law for time varying fields. 7M

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| Hall Ticket Number : | | | | | | | | | | |
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**R-14**

**Code: 4G231**

II B.Tech. I Semester Supplementary Examinations October 2020

# Switching Theory and Logic Design

( Electrical and Electronics Engineering )

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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**UNIT–I**

1. a) Convert the following numbers as indicated:
   (i) Decimal 225.225 to binary, octal and hexadecimal.
   (ii) Binary 11010111.110 to decimal, octal and hexadecimal. 6M
   b) What is the Gray code? What are the rules to construct Gray code? Develop the 4 bit Gray code for the decimal 0 to 15. 8M

**OR**

2. a) State and prove De-Morgan's Laws. 4M
   b) Draw the symbols and truth tables of all logic gates and explain. 10M

**UNIT–II**

3. a) Prove that OR-AND network is equivalent to NOR-NOR network. 7M
   b) Express the Boolean function $F=A+B^1C$ as a sum of min-terms. 7M

**OR**

4. Realize the following expression using K-map $F=\Pi M(0,1,2,4,5,6,9,11,12,13,14,15)$ and implement the same using NOR logic. 14M

**UNIT–III**

5. Realize the following functions using PLA
   $f_1 (A, B, C) = \sum (0, 2, 4, 5)$ $f_2 (A, B, C) = \sum (1, 5, 6, 7)$ 14M

**OR**

6. For the given 3-input, 4-output truth table of a combinations circuit, tabulate the PAL programming table for the circuit.

| Inputs | | | Output | | | |
|---|---|---|---|---|---|---|
| x | y | z | A | B | C | D |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 |

14M

**UNIT–IV**

7. a) Convert SR flip-flop into JK-flip-flop. 8M
   b) Compare sequential and combinational circuits. 6M

**OR**

8. a) Design a mod-6 asynchronous counter using T-flip flop. 7M
   b) Compare synchronous and asynchronous sequential circuits. 7M

**UNIT–V**

9. a) Explain the capabilities and limitations of finite state machines. 6M
   b) Draw the portion of an ASM chart that specifies the conditional operation to increment register R during state T1 and transfer to state T2, if control inputs z and y are = 1 and 0 respectively. 8M

**OR**

10. a) What are the Moore and Melay machines? Compare them? 7M
    b) What are the salient features of the ASM? 7M

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