Code No: 132AJ **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May - 2019
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CE, ME, MCT, MMT, AE, MIE, PTM, CEE, MSNT)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) State Kirchoff's laws. [2]
b) Draw the wave forms for voltage, current of pure inductor when excited by a sinusoidal voltage. [3]
c) State maximum power transfer theorem. [2]
d) Derive the expression for resonant frequency of a RLC series circuit. [3]
e) Draw the V-I characteristic of a PN diode and show the shift with increase in temperature. [2]
f) What is the purpose of using filters with rectifiers? [3]
g) Define h_{ie} and h_{re}. [2]
h) What are the demerits of fixed bias method of a transistor? [3]
i) Explain principle of operation of SCR. [2]
j) Compare BJT and FET. [3]

PART-B

(50 Marks)

2.a) Differentiate dependent and independent sources.
b) Find the power in 30Ω resistance using nodal analysis for the circuit shown in figure 1. [5+5]

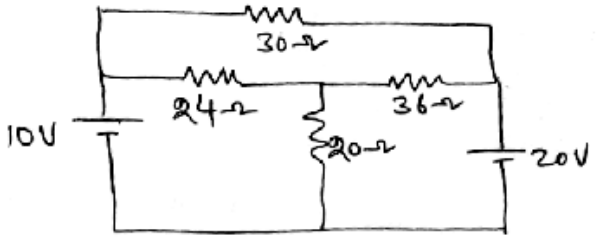

Figure: 1

OR

3.a) A wire carries a current, which is a combination of a d.c current of 10A and a sinusoidal current with a peak value of 10A. Determine RMS value of the resultant.
b) An impedance $z_1 = (6 + j8)\Omega$ is connected in series with a parallel combination of impedances $z_2 = (10 + j6)\Omega$, $z_3 = (8 - j10)\Omega$ and is connected to a 300V, 50Hz supply. Find the total active power, reactive power and power factor of the circuit. [5+5]

4.a) A series RLC circuit with R = 100Ω, L = 0.6H and C = 45μF is applied a voltage of $100\angle 0^0 V$ with variable frequency. Calculate resonant frequency, current at resonance, voltage across R, L and C at resonance.

b) Derive the expression for half power frequencies of a RLC series resonant circuit. [5+5]

OR

5.a) For the circuit shown in the figure 2 draw current locus diagram.

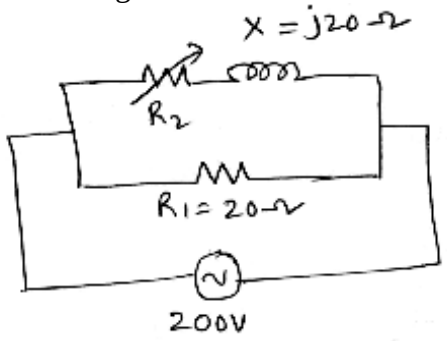

Figure: 2

b) By using superposition theorem find the current in the 6Ω resistance of the following circuit shown in figure 3. [5+5]

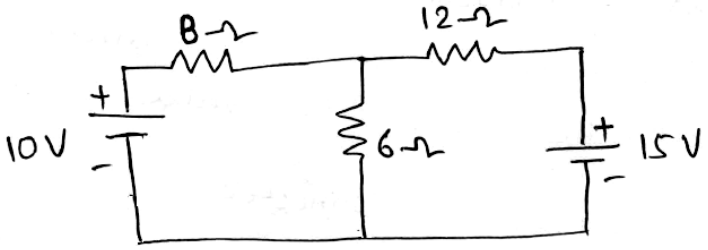

Figure: 3

6.a) Define the terms dynamic resistance of a diode and ' Diffusion capacitance of a diode'.

b) Explain how capacitor filter improves the performance of a full wave rectifier. [5+5]

OR

7.a) Compare the characteristics of centre tapped transformer type and bridge type full wave Rectifiers.

b) Draw the equivalent circuit and V-I characteristic of ideal and piecewise linear model of a PN junction diode. [5+5]

8.a) Draw the simplified h-parameter equivalent circuit of BJT in CB configuration and derive expressions for A_v, A_i, Z_i and Z_o .

b) Explain how bias stabilization and compensation are done using diodes. [5+5]

OR

9.a) Explain voltage divider biasing method with relevant circuit diagrams and equations.

b) Compare CE, CB and CC characteristics of a BJT. [5+5]

10.a) Explain the construction and principle of operation of JFET.

b) Explain how zener diode acts as a voltage regulator. [5+5]

OR

11.a) Draw the energy band diagram of tunnel diode and explain tunneling phenomenon. Draw its V-I characteristics.

b) Explain the working principle of varactor diode. [5+5]

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