R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May/June - 2017
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CE, ME, MCT, MMT, MIE, 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) Draw the V-I characteristics of resistor. [2]
 b) What is reactance? How it varies in case of inductance. [3]
 c) Define Quality factor. [2]
 d) How to calculate Norton's current? [3]
 e) What is diffusion capacitance? [2]
 f) What is ripple factor? How it varies? [3]
 g) What is an NPN transistor? [2]
 h) Draw Common emitter configuration of BJT? [3]
 i) State the applications of Varactor diode. [2]
 j) What is meant by avalanche breakdown? [3]

PART-B
(50 Marks)

2.a) With an example, explain in detail about Nodal analysis.
 b) Find the result in both rectangular and polar forms, for the following, using complex quantities. [5+5]

$$\left(30\angle 45^0 + \frac{1}{3\sqrt{2}\angle -90^0}\right).2\angle 120^0 + 5\angle -60^0 - 8\angle 135^0$$

OR

3.a) Explain in detail about different representations of sinusoidal quantities.
 b) A certain voltage source has a terminal voltage of 120 V when the load current is 1A. When the load current is 2A, the terminal voltage is 100V. Calculate the internal resistance of the voltage source, open circuit voltage and short circuit current. [5+5]

4.a) State and explain Millman's theorem for DC excitations.
 b) A series combination of resistance of 100Ω and a coil with inductance 0.5 H and winding resistance 50Ω and a capacitor of 0.36 μF is connected to an AC supply with internal resistance 50Ω. Find the resonant frequency and quality factor. [5+5]

OR

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5.a) Draw the admittance locus diagram of series RC circuit and explain.
  b) Using maximum power transfer theorem, determine the maximum power that is delivered to the unknown resistor R in the circuit below. [5+5]
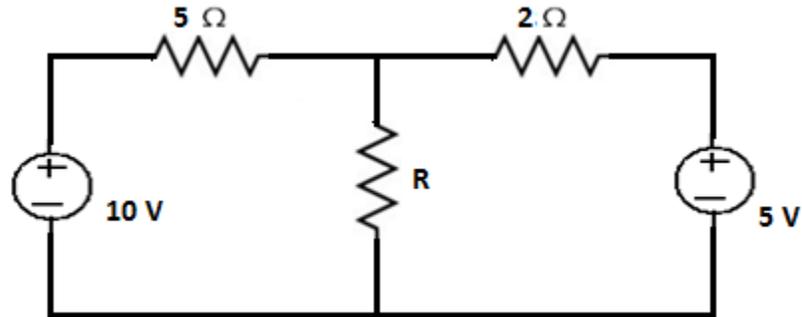
6.a) Draw the Energy band diagram of PN junction diode and explain.
  b) A single phase half wave rectifier operates from 230V, 50 Hz supply. The load resistance is 5Ω. Find out the output voltage and current. [5+5]

OR

7.a) Draw the V-I characteristics of P-N junction diode and explain.
  b) A single phase full wave rectifier operates from 230V, 50 Hz supply. The load resistance is 10Ω. Draw the wave forms of all the diode currents and represent the values. [5+5]

8.a) Discuss in detail about the construction of BJT.
  b) Draw the CB configuration of BJT and explain in detail. [5+5]

OR

9.a) Explain in detail about the principle of operation of BJT.
  b) Explain in detail about the Emitter feedback bias of transistor with neat sketch. [5+5]

10.a) Explain in detail about the principle of operation of JFET.
   b) Draw the characteristics of Zener diode and explain. [5+5]

OR

11.a) Give the detailed comparison of BJT and FET.
   b) Explain in detail about the principle of operation of SCR. [5+5]

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