R13

B.Tech I Year (R13) Supplementary Examinations December/January 2014/2015
BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

Answer all the questions
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PART – A

UNIT – I

1 (a) Write short notes on star-delta transformation. Derive the necessary equations.
 (b) A resistance of 50 Ω, an inductance of 0.5 H and a capacitance of 50 µF are connected in series across 220 V, 50 Hz mains. Determine: (i) Impedance of the circuit. (ii) Current taken from the mains. (iii) Power and power factor of the circuit.

OR

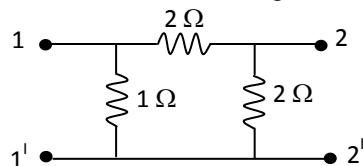2 Explain in detail the active elements and passive elements.

UNIT – II

3 (a) State Millmann's theorem and Tellegon's theorem.
 (b) Find the transmission parameters for the resistance network shown in figure below.
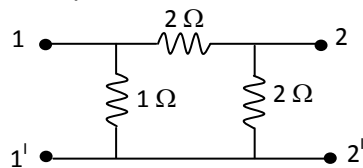
OR

4 (a) Derive expression for the Y parameters in terms of Z parameters.
 (b) Find Hybrid parameters for the following network.

UNIT – III

5 (a) Explain the principle of operation of 3-phase induction motors.
 (b) Explain the characteristics and applications of DC motor.

OR

6 (a) Derive the emf equation of DC generator.
 (b) Explain the constructions details of 3-phase induction motor.

PART – B

UNIT – I

7 (a) Draw the forward characteristics of the semiconductor diode and explain the nature of variation with reference to the equation for forward current of the diode.
 (b) A PN junction diode has a reverse saturation current of 5/µA at 25°C. Determine its static and dynamic resistance for a forward bias of 0.2 V at 75°C.
 (c) Discuss the features that are responsible for maintaining constant voltage across the load in simple voltage regulator circuit using a zener diode.

OR

8 (a) With the help of necessary graphs and sketches explain the potential distribution in an open circuited p-n junction.
 (b) In a full wave rectifier the required DC voltage is 9 V and the diode drop is 0.8 V, calculate ac rms input voltage required in case of bridge rectifier circuit and center tapped full wave rectifier circuit.
 (c) Distinguish between drift current and diffusion current.

UNIT – II

9 (a) Show the various regions of operation on the output characteristics of a CE transistor and explain their significance in the use of transistor as an amplifying device.
   (b) Define the different parameters of FET.
   (c) Draw a circuit diagram with biasing voltages to obtain the drain characteristics and the transfer characteristics of N-channel depletion enhancement MOSFET device.

OR

10 (a) Define stability factor. Why is it necessary for a BJT circuit? Derive the relation between α & β.
    (b) Explain how FET works as voltage variable resistor. Differentiate FET and MOSFET.

UNIT – III

11 Draw the circuit diagram of a RC phases shift oscillator using BJT and derive the expression for frequency of oscillations.
    Describe the operation of an Op – Amp based differentiator.

OR

12 (a) The gain of an amplifier is decreased to 1000 with negative feedback from its gain of 5000. Calculate the feedback factor and the amount of negative feedback in dB.
    (b) Derive closed loop voltage gain, input resistance, output resistance and band width for Op-amp inverting amplifier with feedback arrangement.

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