JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, August/September - 2022
BASIC ELECTRICAL ENGINEERING
(Common to CSE, IT)

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

Answer any five questions
All questions carry equal marks

1.a) State and explain super position theorem.
   b) Calculate the resistance between the points A and B for the following network
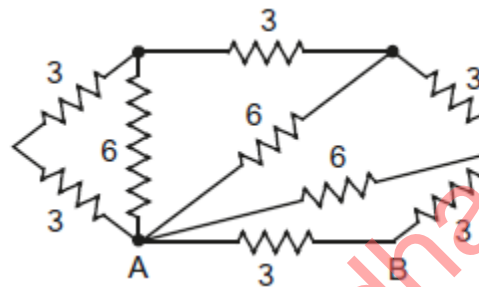   (figure 1):   [6+9]

Figure 1

2.a) Using delta to star transformation, determine the resistance between terminals a and b
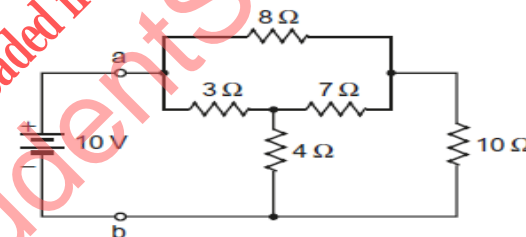   and the total power drawn from the supply in the circuit for the following figure 2:

Figure 2

   b) State and explain Thevenin's theorem.   [9+6]

3.a) Explain the following terms with respect to alternating quantities:
      i) Instantaneous value
      ii) Cycle
      iii) Time period
      iv) Frequency
      v) Amplitude.
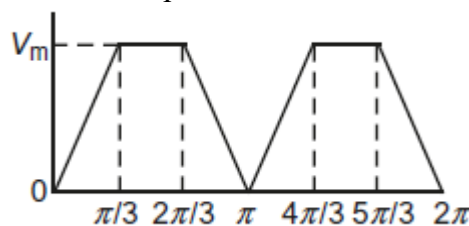   b) Find the average value of the periodic function shown below in figure 3:   [8+7]

Figure 3

4.a) Draw the phasor and wave diagram for voltage and current in an R – C series circuit connected with sinusoidal excitation.

b) A voltage of 125 V at 50 Hz is applied across a non-inductive resistor connected in series with a capacitor. The current in the circuit is 2.2 A. The power loss in the resistor is 96.8 W and that in the capacitor is negligible. Calculate the resistance and the capacitance. [8+7]

5.a) Distinguish between core-type and shell-type transformers in detail.

b) The secondary of a 500 kVA, 4400/500 V, 50 Hz, single-phase transformer has 500 turns. Determine (i) emf per turn, (ii) primary turns, (iii) secondary full-load current, and (iv) maximum flux. [7+8]

6.a) Explain the principle of working of a transformer. Draw its phasor diagram on no-load.

b) A 230/110 V single-phase transformer has a core loss of 100 W. If the input under no-load condition is 400 VA, find core loss current, magnetizing current, and no-load power factor angle. [8+7]

7.a) Explain the principle of operation and brief constructional details of a DC machine.

b) A three-phase, four-pole induction motor is supplied from three-phase, 50 Hz AC supply. Calculate (i) synchronous speed, (ii) rotor speed when slip is 4%, and (iii) rotor frequency, When rotor runs at 600 rpm. [9+6]

8.a) Explain the various methods for providing damping torque in an instrument.

b) Explain construction and principle of operation of a moving coil instrument with a neat diagram. [7+8]

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