Note : Attempt any FIVE questions in All. All questions carry equal marks.

Q.1(a) Explain the characteristics of
        (i) Ideal and Practical voltage source   (4)
        (ii) Ideal and Practical current source

  (b) Reduce the following network shown in Fig.1 to the simplest form which consists of only single voltage source using source transformation technique.   (4)
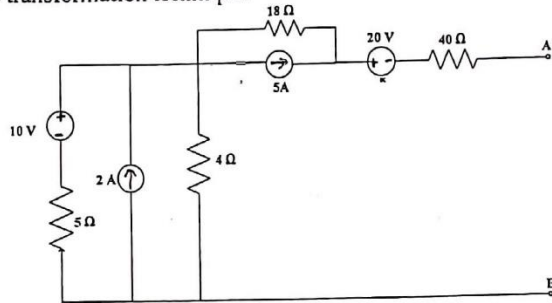

Fig. 1

Q.2 (a) Obtain the expression of equivalent resistances in delta(Δ)of a given star (Y) connected resistances. (4)
  (b) State Maximum Power Transfer theorem and illustrate with the help of an example.   (4)

Q.3 (a) State Superposition theorem. Explain its advantages and limitations.   (4)
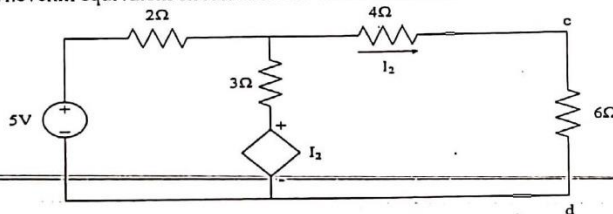 (b) Determine the Thevenin equivalent circuit as seen from terminals cd for the circuit shown in Fig. 2.   (4)

Fig. 2

Q.4(a) How is the effective value determined for nonsinusoidal waveform? Determine the rms value of a resultant current in a wire carrying simultaneously a direct current of 10A and a sinusoidal current of peak value of 10 A.   (4)

  (b) A series circuit consists of 1200 Ω resistor, a 1.0 H coil, and a capacitor C. Determine the value of C and the bandwidth of the circuit if the resonant frequency is 4 kHz.   (4)

Q.5 (a) Explain with phasor diagram the measurement of the power and pf of a balanced three phase load with the help of two wattmeter method.   (4)

  (b) A 400 V, 3 phase supply is connected across a balanced network of three impedances each consisting of a 32 Ω resistance and 24 Ω inductive reactance. Determine the line current and power factor when the impedances are connected in delta. Draw the phasor diagram showing phase voltages, line voltages and currents.   (4)

Q.6 (a) Draw the analogy between electric and magnetic circuits. State and explain Kirchhoff's laws for magnetic circuits.   (4)

  (b) What are the various losses in a transformer? Explain with the help of circuit diagram the tests needed to determine these losses.   (4)

Q. 7 Write short notes on *any two* of the following: (4x2)
    (i)   Shunt and multipliers for instruments   (ii) Autotransformer
    (iii)   PMMC instruments   (iv) Digital Voltmeter

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