Faculty of Engineering & Technology
First Semester B.E. (CBS) Examination
BASIC ELECTRICAL ENGINEERING
Paper—IV

Time : Two Hours] [Maximum Marks : 40

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Assume suitable data wherever necessary.
(3) Illustrate your answers wherever necessary with the help of neat sketches.
(4) Use of non-programmable calculator is permitted.

1. (a) Find the value of resistance R and voltage V_s in the circuit shown in Fig. 1(a). All resistors are in ohms. 6

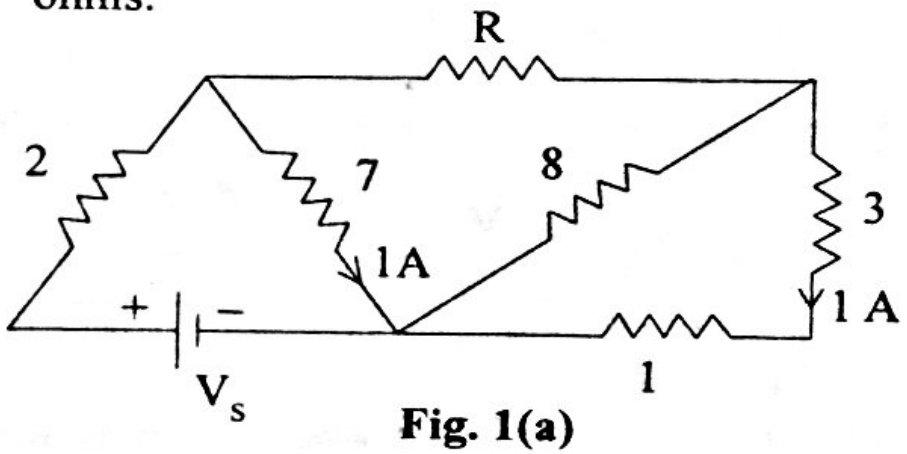

Fig. 1(a)

(b) State and explain Kirchoff's voltage and current laws with suitable example. 4

OR

2. (a) Find the equivalent resistance between points A and B using star-delta transformation. Refer Fig. 2(a). 6

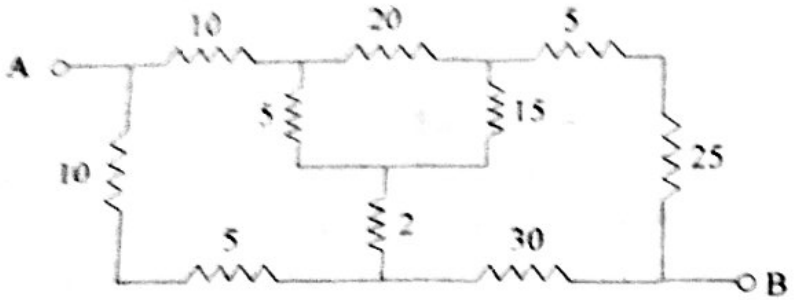

Fig. 2(a)

(b) Compute the power dissipated in the 9 Ω resistor as shown in Fig. 2(b) by applying superposition theorem. The voltage and current sources should be treated as ideal. All resistors in ohms. 4

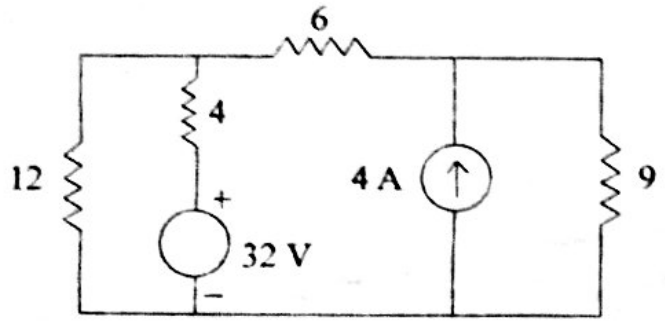

Fig. 2(b)

3. An iron ring of mean length of 30 cm is made of three pieces of cast iron, each has the same length but their respective diameters are 4, 3 and 2.5 cm. An air gap of length 0.5 mm is cut in the 2.5 cm diameter piece. If a coil of 1000 turns is wound on the ring, find the value of current it has to carry to produce a flux density of 0.5 wb/m² in the air gap. The B-H char. of cast iron may be drawn from the following :

B (wb / m²)	0.1	0.2	0.3	0.4	0.5	0.6
H (AT / M)	280	620	990	1400	2000	2800

10

OR

4. (a) Compare electric and magnetic circuits with respect to their similarities and dissimilarities. 5

(b) Explain the terms :—

(i) Reluctance, (ii) Flux density, (iii) Coercive Force, (iv) Magnetomotive force, (v) Residual flux. 5

5. (a) When a 100 V, 50 Hz ac source is connected to a coil A, the resulting current is 8A and the power delivered is 120 W. When the same source is connected to coil B, the resulting current is 10 A and the power delivered is 500 W. What current and power will be taken from the source, if the two coils joined in series are connected to it ? 6

(b) Discuss the resonance in R-L-C series circuit with the help of phasor diagram. 4

OR

6. (a) Prove that a three phase balanced load draws three times as much power when connected in delta, as it would draw when connected in star. 4

(b) Three resistances each of 500 Ω are connected in star to 400 V, 50 Hz, 3 Phase supply. If three capacitor when connected to delta to the same supply take the same line currents, calculate the capacitance of each capacitor and the line current. 6

7. (a) Derive an emf equation for the single phase transformer. 4

(b) A 400/200 V single phase transformer is supplying a load of 50 amp. at the power factor of 0.866 lagging. The no load current is found to be 2 amp. at 0.208 p.f. lagging. Calculate the current and power factor on primary side of transformer. Draw the phasor diagram. 6

OR

8. (a) Describe open circuit test and short circuit test on 1 phase transformer in brief. 5

(b) A 5 KVA, 2300/230 V, 50 Hz transformer was tested for the iron losses with normal excitation and Cu. losses at full load and these were found to be 40 W and 112 W respectively. Calculate the efficiencies of the transformer at 0.8 p.f. for (i) Half load (ii) Full load. 5