C 26950 (Pages : 3) Name.....

Reg. No.....

COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2003

A1 2K 109. BASIC ELECTRICAL ENGINEERING

(EE/EC/IC)

(New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

1. (a) State and explain Kirchhoff's current and voltage laws.

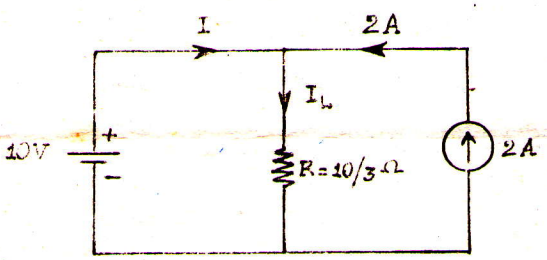
(b) Draw the normal magnetization curve of ferromagnetic material and explain various zones.

(c) Explain constant flux linkage theorem.

(d) Explain the pulse response of a RC circuit.

(e) Find the average and rms value of a sine wave.

(f) Show that the power supplied by the current source in the figure would be doubled that supplied by the voltage source when R = 10/3 Ω.



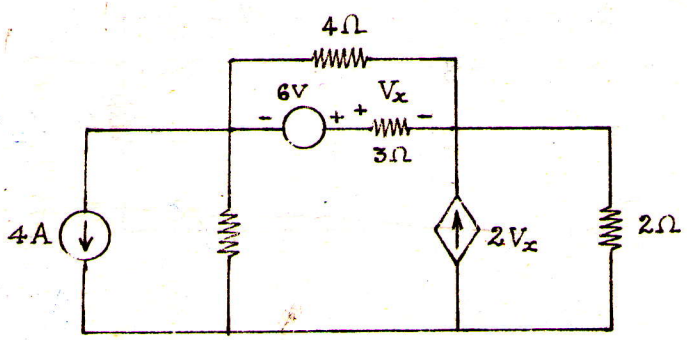
(g) Each phase of a 3 phase alternator produces a voltage of 6351 volts and can carry a maximum current of 315 amperes. Find the line voltage, maximum line current and total kVA capacity of the alternator if it is (i) Y and (ii) Δ connected.

(h) Write a short note on relationship between symmetrical components and unbalance phors.

(8 × 5 = 40 marks)

Part B

2. (a) (i) In the resistive circuit given below, with a dependent source, find the value of V_x.



(8 marks)

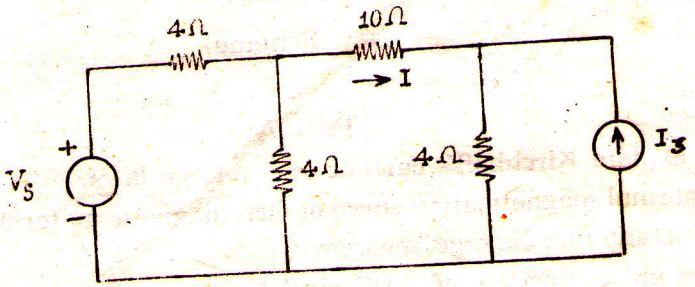
Turn over

(ii) In the circuit given below :

(1) V_s = 16 V ; find I_s for I = 0.

(2) I_s = 16 A ; find V_s for I = 0.

Use principle of superposition.



(7 marks)

Or

(b) (i) Write a short note on Hysteresis loop. (8 marks)

(ii) What do you mean by dielectric strength ? Explain in detail. (7 marks)

3. (a) Sketch the current and voltage waves :

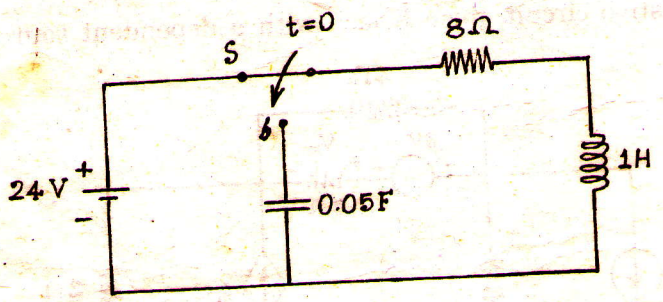
$i = I \sin(\omega t - 60°)$

$v = V \cos(\omega t + 30°)$

What is the angular difference between the two neighbouring positive peaks of the two waves ? Which positive peak leads the other ?

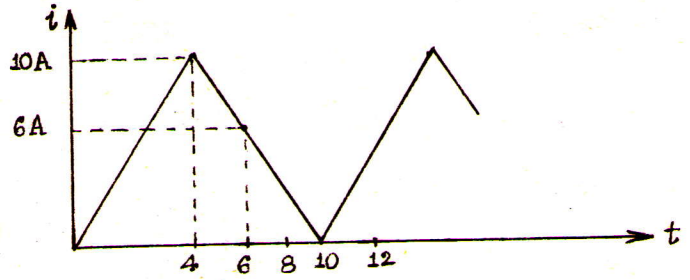
Or

(b) In the circuit, the switch has been in position "*a*" for a long time. At $t = 0$ the switch is thrown into position "*b*". Determine $i(t)$ at $t > 0$ and sketch its waveform.



(15 mark

4. (a) A time varying current shown in figure is passing through a 2 ohm resistor. Find the average and effective values of the voltage across the resistor.

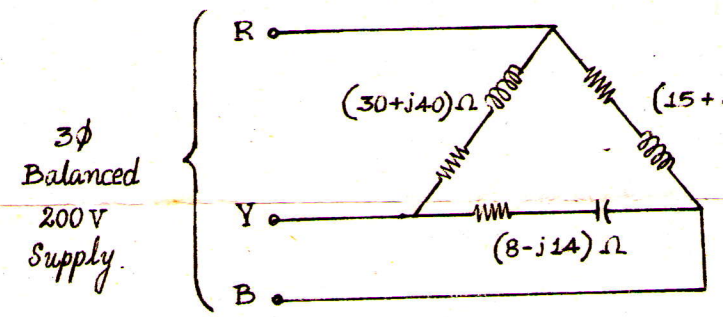


Or

(b) For a two-branch parallel circuit $R_L = 15\ \Omega$, $R_C = 30\ \Omega$, $X_C = 30\ \Omega$, $E = 120$ V and $f = 60$ c/s. For the condition of resonance. Calculate (i) the two values of L and (ii) the two values of total current.

(15 marks)

5. (a) Determine the line currents for the unbalanced delta connected load if the phase sequence is (i) RYB and (ii) RBY.



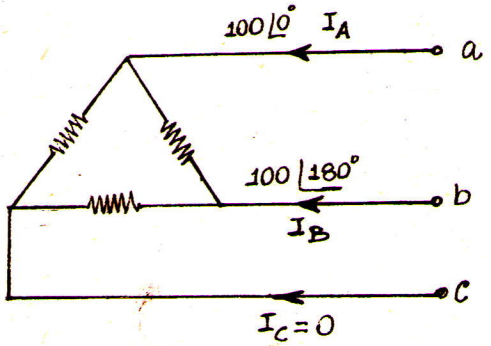
(15 marks)

Or

(b) (i) Determine the unbalanced phase voltage V_a, V_b, V_c in a circuit where $V_{a1} = 50\angle 0°$, $V_{a2} = 10\angle 90°$ and $V_{a0} = 10\angle 180°$.

(8 marks)

(ii) The current flowing in the line "a" supplying a delta connected load is 100 amp. With the current in line "a" as reference and assuming that line "c" is open find the symmetrical components of the line currents.



(7 marks)

[4 × 15 = 60 marks]