

(OLD COURSE)

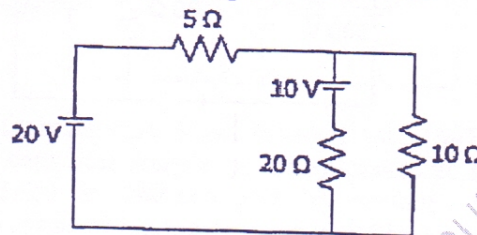
Q.P. Code : 3087

(3 Hours)

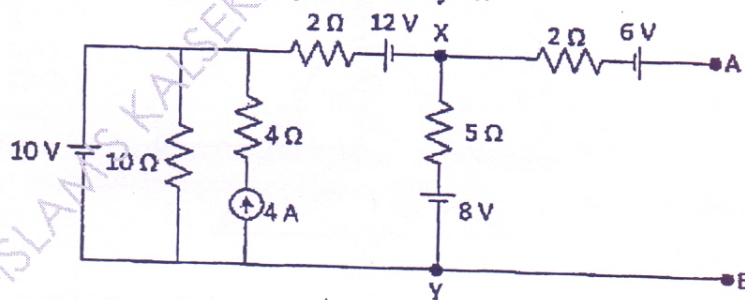
[Total Marks : 100

- N.B.: (1) Question No.1 is compulsory.
 (2) Attempt any four out of remaining.

- Q.1 a) The resistance of a motor winding increases from 70Ω at 25°C to 100Ω at 70°C . Find the resistance temperature coefficient at 0°C . (3)
 b) Find current through 20Ω by superposition theorem. (3)

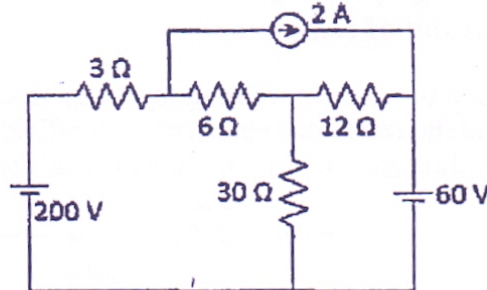


- c) Instantaneous wave equation for a voltage $v=200 \sin(5000t - 30^\circ)$. Find V_{rms} , Time period. (2)
 d) Plot the graphs of current Vs frequency in RLC series circuit having very small value of R, medium value of R and very high value of R. (3)
 e) In a three phase star connected load, $V_{\text{YB}}=400\angle 80^\circ$. Find V_{RN} . Phase sequence is RYB. (2)
 f) For a single phase transformer of 10KVA, maximum efficiency occurs at 8.16KVA load. If iron loss is 80W. Find full load copper loss. (3)
 g) Draw the phasor diagram of capacitor start induction run motor. (2)
 h) Find ripple factor for half wave rectifier. (2)
- Q.2 a) Find voltage across X & Y by nodal analysis. (6)

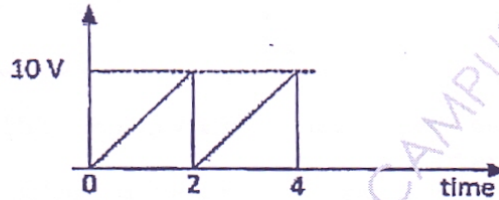


- b) if a voltage of $v=260\sin(314t + 30^\circ)$ V is being applied to an impedance. A current of $2\angle -15^\circ$ A flows through the circuit. Find resistance, reactance and pf of the circuit. (6)
 c) Draw the phasor diagram of transformer on lagging power factor load. (8)
- Q.3 a) Derive the relation between line and phase quantities in three phase star connected load. (8)
 b) Explain short circuit test to find equivalent circuit parameters of the single phase transformer. (4)
 c) Explain production of rotating magnetic field in three phase induction motor. (8)

Q.4 a) Calculate current in 12Ω resistance by thevenin's theorem. (7)

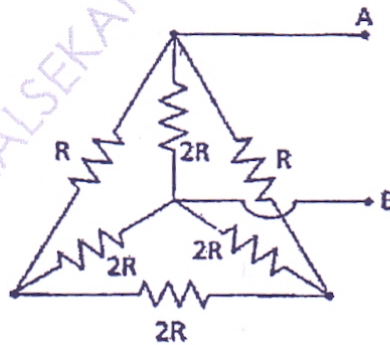


b) Find V_{RMS} . (4)

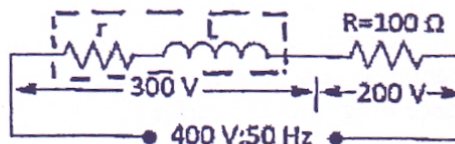


- c) Calculate the total power and readings of two wattmeters connected to measure power in three phase balanced load if the reactive power is 15KVAR & load pf is 0.8 lag. (4)
- d) Draw the input and output waveforms of full wave bridge rectifier and find ripple factor, rectification efficiency. (5)

Q.5 a) Determine equivalent resistance between A & B. (7)

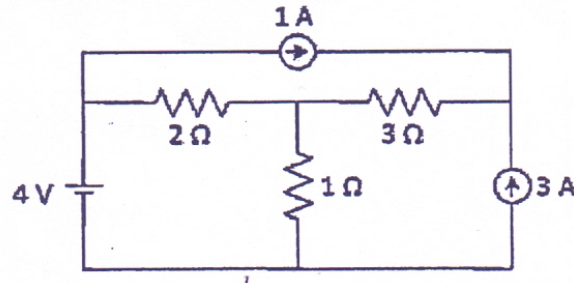


b) Find power & power factor of choke coil and power factor of complete circuit. (5)



- c) A 10KVA, 450V/120V, 50 Hz, single phase transformer gave following results (8)
- OC test(LV side):- 120V, 4.2A, 80W
- SC test(HV side):- 9.65V, 22.2A, 120W.
- Calculate equivalent circuit parameters referred to primary, efficiency at 0.8 pf lag and maximum efficiency at 0.8 pf lag.

- Q.6 a) Find current in 1Ω resistance by superposition theorem. (7)



- b) A coil of 400Ω resistance & an inductor of $318\mu\text{H}$ is connected in parallel with a capacitor and the circuit resonates at 1MHz . If a second capacitor of 23.5pF is now connected in parallel with first capacitor, Find the frequency at which the new circuit resonates. (7)
- c) A three phase star connected load across 400V , 50Hz three phase supply takes 10KW and a line current of 20A . Find the readings of two wattmeters connected to measure power in the circuit. (6)
- Q.7 a) An alternating current of 50Hz frequency has a maximum value of 100A . Calculate its value $1/600$ seconds after the instant of current zero and increasing positively thereafter. (2)
- b) Two currents i_1 & i_2 are meeting at a point. Find resultant current. (3)
 $i_1 = 10 \sin(\omega t - 30^\circ)\text{A}$ & $i_2 = 5 \cos(\omega t - 70^\circ)\text{A}$
- c) Find all day efficiency of a 500KVA transformer where full load copper loss and iron loss are 4.5KW and 3KW respectively. During a day, it is loaded as follows (5)
- | Loading in KVA | No. of Hours | pf |
|----------------|--------------|------|
| 500 KVA | 6 | 0.8 |
| 400 KVA | 10 | 0.75 |
| 125 KVA | 4 | 0.8 |
| No load | 4 | |
- d) Derive an expression for emf induced in DC motor. (5)
- e) Draw and explain input and output characteristics of CE configuration of BJT. (5)