

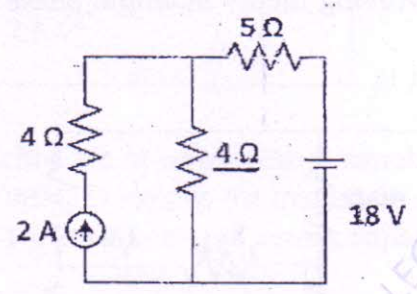
(OLD COURSE)

(3 Hours)

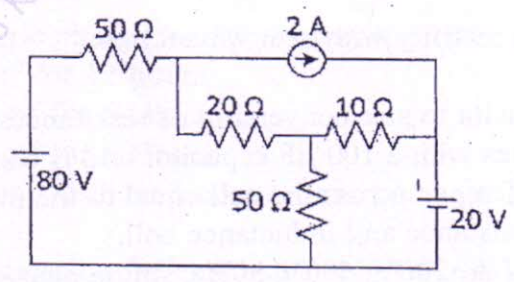
[Total Marks : 100

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

- 1. (a) The resistance of a 50Ω resistor is increased by 10% when its operating temperature increased from 20°C to 50°C . Calculate resistance temperature coefficient at 0°C . 3
- (b) Find current through 4Ω resistance by superposition theorem. 3



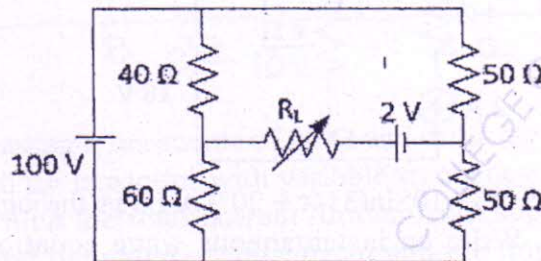
- (c) An instantaneous current $i = 10\sin(314t + 20^\circ)$ A flows through a circuit containing pure resistor of 5Ω . Write an instantaneous wave equation of voltage across resistor. 2
 - (d) In inductive coil containing resistance 10Ω and inductance of 0.1H is connected in parallel with a capacitor of $150\mu\text{F}$. Find resonant frequency of the circuit & dynamic impedance of the circuit. 3
 - (e) The readings of the two wattmeters connected to measure three phase power input are 1000W and 500W . Find total reactive power in the circuit. 2
 - (f) Draw the circuit diagram to carry out short circuit test on single phase transformer. 3
 - (g) Explain working principle of a three phase induction motor. 2
 - (h) Define rectification efficiency of a full wave rectifier. 2
2. (a) Find current in 10Ω by mesh analysis. 6



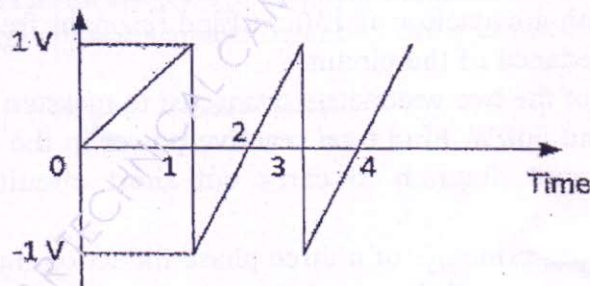
LM-Con. 10251-14.

[TURN OVER

- (b) A coil having resistance of 10Ω and an inductor of 50mH is connected to a 230V , 50Hz supply. Find impedance of a coil, current, power factor of a coil and power factor of complete circuit. 6
- (c) Draw the phasor diagram of a transformer on lagging pf load & write meaning of all the terms used. 8
3. (a) Derive the relation between line and phase quantities in three phase star connected load. 8
- (b) Explain open circuit test to calculate R_0 & X_0 of a single phase transformer. 4
- (c) Explain double field revolving theory in single phase induction motors. 8
4. (a) Find maximum power in R_L . 7



- (b) Find rms value of waveform shown. 4

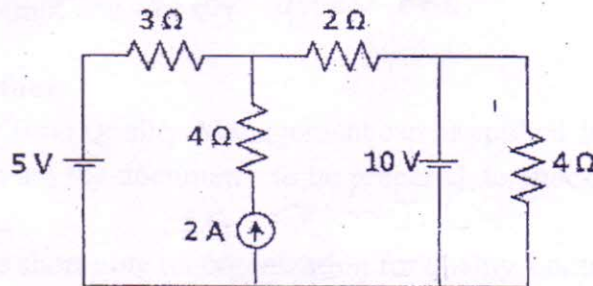


- (c) A three phase star connected load has a pf 0.4 lag. Two wattmeters are connected to measure power input. Total power in the circuit is 30KW . Find readings of each wattmeter. 4
- (d) Explain full wave bridge rectifier with neat waveforms. 5
5. (a) Derive the formula for delta to star conversion of resistances. 7
- (b) A coil of 0.6 pf is in series with a $100\mu\text{F}$ capacitor and is connected to a 50Hz supply. The potential difference across the coil equal to the potential difference across capacitor. Find resistance and inductance coil. 5
- (c) The OC & SC on a 5KV A , $200\text{V}/400\text{V}$, 50Hz , single phase transformer gave following test results 8
- OC Test (meters on LV) 200V , 1A , 100W
- SC Test (meters on HV) 15V , 10A , 85W .

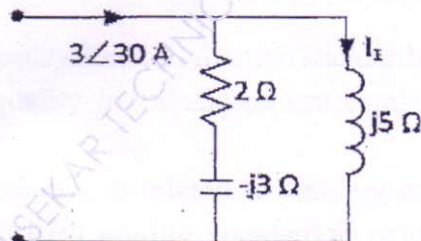
[TURN OVER

Calculate equivalent circuit parameters referred to primary, Calculate efficiency of transformer at full load, 0.8 pf Lag.

6. (a) Find the current in 2Ω by superposition theorem. 7



- (b) A resistor and a capacitor are in series with a variable inductor. When the circuit is connected to a 220V, 50Hz supply, the maximum current obtainable by varying the inductance is 0.314A. The voltage across capacitor is then 800V, find R, L and C. 7
- (c) Prove that the two wattmeter method can measure power input taken by a three phase star connected circuit. 6
7. (a) An alternating current of 50Hz frequency has a maximum value of 100A. Calculate its value $1/600$ sec after the instant of current zero and increasing positively thereafter. 2
- (b) Find the current in inductor for the circuit shown. 3



- (c) A 15KVA single phase transformer was loaded as follows 5
- 2KW at 0.5 pf for 12 hours
12KW at 0.8 pf for 6 hours
18KW at 0.9 pf for 6 Hours.
If iron loss and full load copper loss both are equal to 153W, Find all day efficiency.
- (d) Derive an expression for emf induced in DC motor. 5
- (e) Describe experimental setup to obtain the input output characteristics of CE configuration of BJT. 5