

1128
B.E. (Electrical and Electronics Engineering)
First Semester
EE-E101: Basic Electrical Engineering

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part. Missing data (if any) can be appropriately assumed.

x-x-x

Q1. Explain in brief.

(5*2=10)

- a) Calculate the net equivalent resistance between X-Y terminals in fig 1.
- b) What is a balanced three phase system? How is a three phase supply system specified?
- c) Define self and mutual inductance. What do you mean by coefficient of coupling?
- d) Define voltage regulation of a transformer. Also write the general expression used to calculate the voltage regulation.
- e) Role of commutator in DC machine.

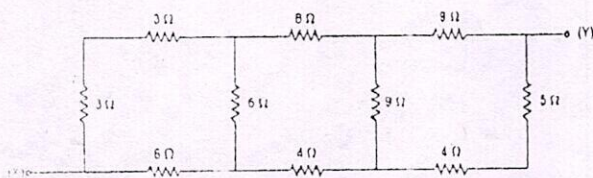


Fig.1

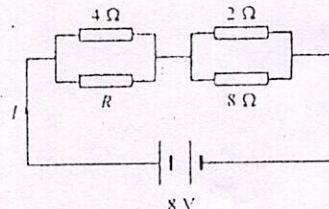


Fig.2

Part A

Q2. A) The total power consumed by the network is 16 watts. Find the value of R and the total current of the circuit shown in fig. 2 (5)

B) State the maximum power transfer theorem and explain its importance. (3+2)

Q3. A) The equation of an alternating current is $i = 62.35 \sin 323t$ Amp. Determine its (i) Maximum Value (ii) frequency (iii) R.M.S Value (iv) Average value and (v) Form Factor. (5)

B) The current in series circuit $R = 5$ and $L = 30$ mH lags the applied voltage by 80° . Determine the source frequency and the impedance Z. (5)

Q4. A) Obtain the relationship between the line currents and phase currents in a balanced 3 phase delta connected system. (5)

B) Three identical coils, each having resistance of 15 ohms and inductance of 0.03 H are connected in delta across a three phase 200V, 50 Hz supply. Calculate: (i) the phase currents, (ii) the line currents, (iii) the total power consumed, (iv) power factor and power factor angle. Draw a neat phasor diagram (5)

Part B

Q5. A) An iron ring of mean length 30 cm has an air gap of 2 mm and a winding of 200 turns. If the permeability of iron core is 300 when a current of 1 amp. Flows through the coil, find the flux density. (5)

B) Develop the analogy between a magnetic circuit and an electric circuit. (5)

Q6. A) Explain the working of single phase transformer with suitable diagrams operating on lagging power factor load. (5)

B) A 5KVA, 500/250 Volt, 50 Hz, single phase transformer gave the following readings.

O.C test: 500V, 1 A, 50 W (L.V. side open)

S.C test: 25 V, 10A, 60W (L.V. side short).

Determine: (i) the efficiency on full load, 0.8 lagging power factor

(ii) The efficiency on 60 % of full load, 0.8 leading power factor.

(iii) Draw the equivalent circuit referred to primary and insert all the values in it. (5)

Q7. A) Explain with a neat sketch the construction of a DC machine. Also explain is there any constructional difference in DC generator and DC motor? (5)

B) Explain how rotating magnetic field is produced in three phase induction motor. Also define the term slip. (5)

x-x-x