

- (vii) The rating of transformer may be expressed in _____.
 (a) kW (b) kVAR (c) kVA (d) Horse power
- (viii) The efficiency of a transformer is maximum when
 (a) copper loss is zero
 (b) iron loss is zero
 (c) copper loss is 50% of the iron loss
 (d) copper loss is equal to iron loss.
- (ix) The number of parallel paths in lap connected armature winding of a 4 pole dc machine is
 (a) number of poles (b) half the number of poles
 (c) two (d) four.
- (x) What is the value of slip for a three-phase, 50 Hz, 6-pole induction motor running at 950 rpm?
 (a) 4% (b) 5% (c) 3% (d) 1.11%.

Group - B

2. (a) Find the current through 5 Ω resistance using Superposition Theorem for the circuit shown in Fig.1.

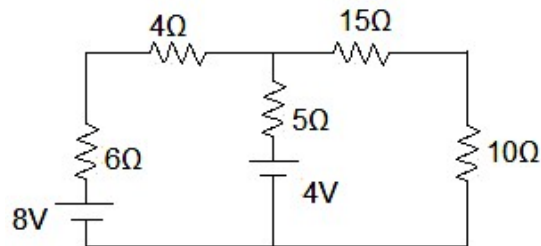


Fig. 1

- (b) State and prove Maximum Power Transfer theorem for a DC network.
7 + (2 + 3) = 12
3. (a) Deduce the expression for the emf developed in a dc motor.
 (b) A 6-pole Lap wound dc shunt generator has a useful flux per pole of 0.03 Wb. The armature has 400 conductors and resistance of 0.4 Ω. Calculate the terminal voltage when the armature is rotating at 1000 rpm and armature current is 40 A.

- (c) Draw and explain the open circuit characteristic of dc generator.
4 + 5 + 3 = 12

Group - C

4. (a) State and prove Gauss's Law.
 (b) Derive the expression of Capacitance of Parallel plate capacitor.
 (c) Three capacitors A, B and C are connected in series across 100 V d.c. supply. The voltages across the capacitors are 20 V, 30 V and 50 V respectively. If the capacitance of A is 10 μF, calculate the capacitances of B and C.
(2 + 3) + 3 + (2 + 2) = 12
5. (a) Write down similarities and dissimilarities of magnetic circuit and electric circuit.
 (b) The combined inductance of the two coils connected in series is 0.8 H and 0.3 H, depending on the relative directions of currents in the coils. If one of the coils, when isolated, has a self inductance of 0.15 H, then calculate (i) mutule inductance (ii) coefficient of coupling.
 (c) State and proof the Ampere's circuital Law.

4 + (2 + 2) + 4 = 12

Group - D

6. (a) A resistance of 100 Ω is connected with an inductance of 1.2 H and capacitance of 10 microfarad in series. The combination is connected across 100 V, 50 Hz supply. Find, (i) Current in the circuit (ii) Voltage across the capacitance (iii) Power consumed (iv) Power factor (v) Draw the phasor diagram.
 (b) Show that for a purely inductive circuit under AC supply current lags the voltage.
(2 + 2 + 2 + 1 + 2) + 3 = 12
7. (a) Explain with the help of neat circuit diagram, the two-wattmeter method for the measurement of power of 3-phase balanced load.