

02995

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Term-End Examination

June, 2012

OIEE-001 : BASICS OF ELECTRICAL
ENGINEERING

Time : 2 hours

Maximum Marks : 70

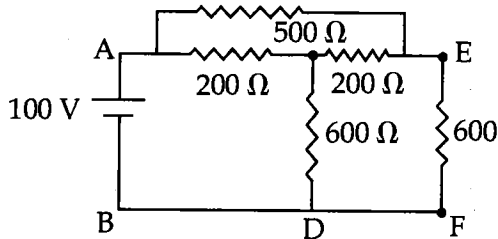
- Note : (i) All the questions are to be answered in English Language only.
- (ii) Attempt **any five** questions. Question No 1 is compulsory.

Attempt the following objective type questions :

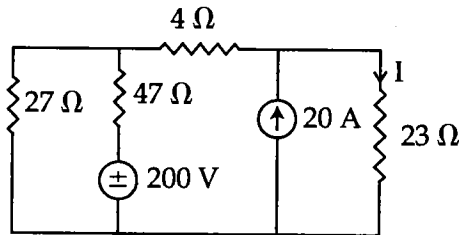
1. (a) A certain piece of Aluminium is to be shaped into a conductor of minimum resistance, its length and cross-sectional area shall be respectively. 2x7=14
- (i) L and A (ii) 2L and $A/2$
- (iii) $L/2$ and 2A (iv) $L/2$ and $A/2$
- (b) A Norton's equivalent is :
- (i) Parallel circuit
- (ii) Series circuit
- (iii) Series-parallel circuit
- (iv) None of the above
- (c) Magnetic field strength H and B are independent of each other (True/False)

- (d) The direction of Electro magnetically induced emf is determined by :
- (i) Flemings right hand rule
 - (ii) Lenz's law
 - (iii) Right hand thumb rule
 - (iv) Both (i) and (ii)
- (e) What will happen if frequency of power supply in pure capacitive circuit is doubled ?
- (i) Current will also be doubled
 - (ii) Current will reduce to half
 - (iii) Current will remain same
 - (iv) Current will increase to four fold
- (f) When a sinusoidal voltage is applied across R-L series circuit having $R=X_L$, the phase angle will be :
- (i) 90°
 - (ii) 0°
 - (iii) 45°
 - (iv) 30°
- (g) In case of 3 phase Y connected circuit total power is given by :
- (i) $\sqrt{3} V_L I_L \cos \phi$ watt
 - (ii) $\sqrt{3} V_L I_L \sin \phi$ watt
 - (iii) $3 V_P I_P \cos \phi$ watt
 - (iv) Both (i) and (iii)

2. (a) Determine the current through $600\ \Omega$ resistance, Branch EF using Y- Δ transformation. $7 \times 2 = 14$



- (b) State super position theorem. Find current I using super position theorem in the following circuit.



3. (a) Compare primary and secondary cells. $7 \times 2 = 14$
 (b) Explain construction, working and application of Nickel cadmium cells.
4. (a) If two current carrying conductor are placed in parallel then what will be force experienced by each conductor if : $7 \times 2 = 14$
 (i) Both are carrying current in same direction
 (ii) Both are carrying current in opposite direction. What will be magnitude of mutual force ? Derive it.

- (b) An iron ring of cross-sectional area 6 cm^2 wound with a wire of 100 turns has a saw cut of 2 mm. Calculate the magnetising current required to produce a magnetic flux of 0.1m wb if mean length of manetic path is 30 cm and relative permeability of iron is 470.
5. (a) What is magnetic hysteresis and hysteresis loop ? Also explain the importance of Hysteresis loop. 7x2=14
- (b) Compare electric and magnetic circuit.
6. (a) Show that current in a pure inductive circuit lags by an angle 90° from voltage.
- (b) Calculate the value of form factor of a full wave rectified wave form. 7x2=14
7. (a) Define power factor. Explain the concept of power triangle with the help of power factor. 7x2=14
- (b) Calculate the capacitance of a condenser to be connected in series with 100V, 80W lamp to enable it to be used on a 200V, 50Hz supply.
8. Write short notes on *any four* : 3½x4=14
- (a) Relation between line and phase voltage in Y connected 3-phase system
- (b) Advantages of 3 - ϕ system over 1 - ϕ system .
- (c) Series resonance.
- (d) Mutual Induction.
- (e) Y - Δ transformation of resistances.
- (f) Core and maintenance of lead acid batteries.