

"Do not write anything on question-paper except Roll Number, otherwise it shall be deemed as an act of indulging in unfair means and action shall be taken as per rules."

Roll No. 230UFE2038

BE I

2

Basic Elect. Engg.

FIRST B.E. EXAMINATION - 2023

(II SEMESTER)

SECTION - E, F, G & H

EE - 105 A : Basic Electrical Engineering

Time - Three Hours

Maximum Marks - 100

Note:- (i) Attempt any **Five** questions.

(ii) Answer should be to the point.

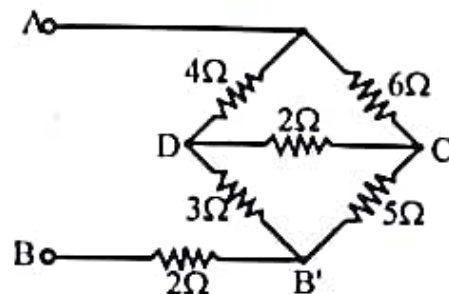
(iii) All questions carry equal marks.

~~1.~~ ~~(a)~~ State and explain °

~~(a)~~ Superposition theorem

~~(b)~~ Thevenin's theorem.

- ~~(b)~~ Find the resistance between A B of the circuit shown in fig. using stardelta transformation.



10+10

2. ~~(a)~~ Define and explain the following: -

~~(a)~~ Phase difference

(b) Frequency

~~(c)~~ Instantaneous value

~~(d)~~ Average value

~~(e)~~ RMS value with respect to alternating quantities.

- (b) A coil in parallel with 200 m.f. capacitor is connected across a 200V, 50Hz supply. The coil takes 8A and loss in the coil is 960 W. Calculate the following:

(a) The resistance of the coil

(b) The inductance of the coil

(c) The power - factor of the entire circuit. 10+10

3. ~~(a)~~ Describe giving a neat diagram the construction and principle of operation of transformer. Differentiate clearly between core type and shell type transformer. Derive the equation of induced

c.m.f. in the primary and secondary windings of a transformer. Assume necessary data if required. clearly state the assumptions made.

- ~~(b)~~ Explain giving neat diagram the direct loading method of determining losses and hence the efficiency of a single - phase transformer. 10+10
4. (a) Explain how the rotating magnetic field is produced in three phase induction motor.
- (b) A 4 pole, three phase induction motor operates from a supply whose frequency is 50Hz calculate:
- (i) The speed at which magnetic field of the stator is rotating.
- (ii) The speed of the rotor when slip is 0.04
- (iii) The frequency of the rotor currents when slip is 0.03
- (iv) The frequency of the rotor currents at stand still.
- 10+10
5. ~~(a)~~ Describe giving neat diagram the construction and principle of operation of D.C. machine. Explain the role of each component part of machine in its operation.
- (b) Write short notes on any two of the following:-
- ~~(i)~~ E.M.F. equation of d.c. generator
- (ii) Torque equation of d.c. motor.
- ~~(iii)~~ Three point starter of d.c. shunt motor. 10+10

6. (a) Why in big alternators (a.c. generators) field system is kept rotating while armature is kept stationary.
- (b) In case of alternators used in thermal power plant the armature is long, where as in case of hydro - electric power plant alternator's armature diameter is large explain why. 10+10
7. ~~(a)~~ List various methods of bulk electric power generation compare their relative merits and demerits.
- ~~(b)~~ Describe briefly how bulk electric power generated at a power plant reaches its ultimate user. 10+10