

- (b) Draw the emf equation of transformer. On what factor does the induced emf in a working depend? Show that emf induced per turn in primary is equal to emf per turn in secondary.

7.5

8. (a) Draw and explain characteristics of a shunt DC motor and series DC motor. 7.5
- (b) Explain the working principle and construction of single-phase induction motor. 7.5

(Compulsory Question)

9. (a) State Thevenin theorem.
- (b) How are voltage and current sources represented?
- (c) Derive the value for maximum power obtained in the circuit.
- (d) What are the advantages of three-phase system over single-phase system?
- (e) Define form factor and peak factor.
- (f) Draw balanced and unbalanced star and delta connection.

Roll No.

Total Pages : 05

Sep-21-00676

B. Tech. EXAMINATION, 2021

Semester II (CBCS)

PRINCIPLES OF ELECTRICAL ENGINEERING

EE-101

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. 9 is compulsory.

Section A

1. (a) Explain the sources of energy in detail. 7.5
- (b) A 100 V, 60 W bulb is connected in series with a 100 V, 50 W bulb and the combination is

connected across 220 V mains. Find the value of the resistance that should be connected across the first bulb so that each bulb may get proper current at the proper voltage. 7.5

2. (a) State Norton theorem and explain the steps involved in this theorem. 7.5
- (b) Derive relationship to express three delta connected resistors into equivalent star connection. 7.5

Section B

3. (a) Define and explain apparent power, real power and reactive power as applied to AC circuit. 7.5
 - (b) A three-phase balanced load connected across a 3-phase, 400 V ac supply which draws a line current of 10 A. Two wattmeters are connected to measure the input power. The ratio of two wattmeter reading is 2 : 4. Find the readings of two wattmeter. 7.5
4. (a) Explain star and delta connections. Give comparison between them. 7.5

- (b) Three similar coils each having a resistance of 15Ω and inductance of 0.04 H are connected in star to a 3-phase 50 Hz power supply 200 V between the lines. Calculate the phase current in the circuit. Calculate the line current if they are now connected in delta. 7.5

Section C

5. (a) Discuss construction, principle of operation and working of PMMC instruments. 7.5
 - (b) Explain the working principle of dynamometer type wattmeter. 7.5
6. (a) Define the terms mmf, magnetic flux and magnetic reluctance. Derive relationship between these quantities. 7.5
 - (b) Draw and explain BH curve. Also discuss hysteresis and eddy current losses in magnetic circuits. 7.5

Section D

7. (a) Discuss open and short circuit test for single-phase transformers. 7.5

- (g) Define relative and absolute permeability.
- (h) Define Q factor of series resonant circuit.
- (i) State torque equation of induction motor.
- (j) Why can transformer not be used with DC supply ? **1.5×10=15**