

Dec.-22-0117

EE-101 (Principles of Electrical Engineering)

B. Tech. 2nd (CBCS)

Time : 3 Hours

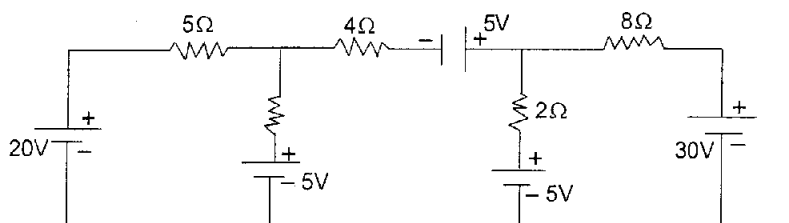
Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Section-E is compulsory. Attempt atleast one question each from other sections. Each section carries equal marks.

SECTION - A

1. (a) Draw general structure or single line diagram of an electric power system. Explain various sections of it.
(b) Give a general layout of a hydro-electric power plant. Explain the functions of different components. (10)
2. (a) State and prove Thevenin's theorem. List its applications.
(b) Determine the current in each branch of the given circuit by using Nodal analysis.



(10)

SECTION - B

3. (a) Distinguish between phasor representation in polar, rectangular, trigonometric and exponential forms with suitable examples.

- (b) Derive relation between I_L and I_{Ph} for balanced delta connected 3- \emptyset circuit. (10)
4. (a) What are different types domestic wiring? Also mention their merits and demerits.
(b) A coil of resistance 20Ω . and inductance 100mH is connected in series with a capacitance of $40\mu\text{F}$ across 100V , 50 Hz AC supply. Calculate:
 - (i) magnitude of current
 - (ii) power factor
 - (iii) phase angle
 - (iv) voltage across each element (10)

SECTION - C

5. (a) With the help of a neat diagram, explain the construction and principle of moving iron instrument.
(b) Describe the construction and working principle of a dynamometer type wattmeter and show how its deflecting force is proportional to the average value of power. (10)
6. (a) Define magnetic hysteresis and draw hysteresis loop. What is the practical significance of magnetization curve?
(b) Explain the eddy current loss, its effects and suggest the ways to reduce the same. (10)

SECTION - D

7. (a) Explain the working of 1- \emptyset auto-transformer. Show that there will be saving of copper in auto-transformer as compared to same rating of two-winding transformer.

[P.T.O.]

- (b) What are the losses occurring in a transformer? Write an expression for calculating efficiency of a transformer and derive the condition for maximum efficiency of a transformer. (10)
8. (a) Explain field control and armature control method used to control speed of DC shunt motor.
- (b) What is the necessity of starter in DC motor? List DC motor starters. Explain any one of these. (10)

SECTION - E (Compulsory)

9. (a) Draw symbols of independent & dependent current sources.
- (b) Distinguish between active and passive elements with example.
- (c) What is peak and average value of an alternating current?
- (d) What is form factor & its significance?
- (e) Three phasors are $A=10+j10$, $B=50\angle 120^\circ$ and $C=8-j6$. Evaluate $(AB)/C$ and express it in rectangular form.
- (f) What are the different types of transformers?
- (g) Which parameters can be obtained from short circuit test conducted on a 1- \emptyset transformer?
- (h) What does double field revolving theory state?
- (i) Write EMF equation of DC generator mentioning all variables.
- (j) Define reactance. (10 \times 2=20)