

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM**  
(AUTONOMOUS)

**II B.Tech I Semester Supplementary Examinations, June - 2024**

**TRANSFORMERS AND DC MACHINES**  
(EEE)

Time: 3 hours

Max. Marks: 70

**Answer ONE Question from each Unit**  
**All Questions Carry Equal Marks**

Q. No.	Questions	BTL	CO	Marks
<b>UNIT – I</b>				
1.	a) Compare between core-type and shell-type transformer.	K2	CO1	7M
	b) A Single-phase transformer is connected to a 230 V, 50 Hz supply. The net cross-sectional area of the core is 60 cm <sup>2</sup> . The number of turns in the primary is 500 and in the secondary 100. Determine: i) Transformation ratio. ii) Maximum value of flux density in the core. iii) E. m. f. induced in secondary winding.	K3	CO1	7M
<b>OR</b>				
2.	a) Explain the working of a transformer on no-load and load condition.	K2	CO1	7M
	b) A 10-kVA, single-phase transformer has its primary connected to a 2000V supply. It has 60 turns on the secondary winding and voltage across it is found to be 240 V. Assuming the transformer to be ideal, calculate (a) the number of turns on its primary winding; (b) the full-load primary and secondary currents.	K3	CO1	7M
<b>UNIT – II</b>				
3.	a) Describe various losses in a loaded transformer. Derive the condition for maximum efficiency in a transformer	K1	CO2	7M
	b) Explain Sumpner's method of testing transformers. Mention its advantages.	K2	CO2	7M
<b>OR</b>				
4.	a) Explain about O.C and S.C test with neat circuit diagrams	K2	CO2	7M
	b) What is an auto transformer? Discuss the advantages and disadvantages.	K1	CO2	7M
<b>UNIT – III</b>				
5.	a) Draw and discuss the connection diagrams of Y-Y, Δ-Δ and Y-Δ three phase transformers.	K2	CO3	7M
	b) Distinguish between off load and on load tap changing transformer.	K4	CO3	7M
<b>OR</b>				
6.	a) Explain the Construction of DC Machine and drive the EMF equation of DC generator	K2	CO3	9M
	b) Recall the phenomenon of electromechanical energy conversion.	K1	CO3	5M
<b>UNIT – IV</b>				
7.	a) Describe the principle of operation of DC motor and write the applications of different DC motors.	K1	CO4	7M

	b)	A 120V DC shunt motor has an armature resistance of $0.2\Omega$ and a field resistance of $60\Omega$ . The full load line current and full load speed are 60A and 1800 rpm. If the brush contact drop is 3V. Find the speed of the motor at half load.	K3	CO4	7M
<b>OR</b>					
8.	a)	With a neat sketch, explain the operation of 3-point starter.	K2	CO4	7M
	b)	Draw different characteristics of shunt, series and compound motors.	K4	CO4	7M
<b>UNIT – V</b>					
9.	a)	Explain the Hopkinson's test for determination of efficiency of shunt machines.	K2	CO5	7M
	b)	A 500V shunt motor takes 4A on no load. The armature resistance including that of brushes is $0.2\Omega$ and the field current is 1A. Estimate the output and the efficiency when the input current is i) 20A and ii) 100A.	K3	CO5	7M
<b>OR</b>					
10.	a)	Explain in detail, how the brake test is conducted on DC Shunt motor?	K2	CO5	7M
	b)	Explain different methods of speed control of dc shunt motor.	K2	CO5	7M