4TH SEM./ELECTRICAL/ 2023(S)

TH-1 ENERGY CONVERSION-I

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. State the function of yoke and commutator in a dc machine.

   b. Define commutation.

   c. What is back emf in dc motor?

   d. What are the losses in dc motor?

   e. Define transformation ratio of transformer.

   f. What are the losses in a transformer? Also define regulation of transformer.

   g. State two uses of auto transformer.

   h. Define ratio error.

   i. State two uses of C.T.

   j. Define all day efficiency.

2. Answer **Any Six** Questions 6 x 5

   a. Classify dc generators and explain with neat diagram.

   b. A 4 pole lap wound d.c shunt generator has a useful flux per pole of 0.09 Wb.The armature winding consists of 220 turns, each of 0.005Ω resistance. Calculate the terminal voltage when running at 1000 rpm if the armature current is 50 A.

   c. Explain briefly about the speed control of dc shunt motor by armature voltage control method.

   d. Sketch the load characteristics of various types of dc motors.

   e. Define efficiency of a transformer. State and derive the expression for condition for maximum efficiency.

   f. What are the conditions for parallel operation of two single phase transformers.

   g Explain the working principle of single phase auto transformer with neat diagram.

3	A 250 volt shunt motor has an armature resistance of 0.5 Ω and the field resistance of 250 Ω. When driving a load, the torque of which is constant takes 30 amp and runs at 500 rpm. It is desired to raise the speed of the motor to 750 rpm. What resistance should be inserted in the shunt field circuit, assuming the magnetization curve to be straight line.	10
4	Define armature reaction .Explain it briefly. Write down its effects.	10
5	Compare auto-transformers with two-winding transformers both having equal kVA rating. Find the ratio of copper required if the ratio of number of turns of the transformer is three.	10
6	A 4 kVA ,200/400 volt,1-phase transformer takes 0.7 amp and 65 watt on open circuit. When the low voltage winding is short circuited and 15 volt is applied to the high-voltage terminals, the current and power are 10 amp and 75 watt respectively. Calculate the full load efficiency at unity power factor and full-load regulation at 0.80 power factor lagging.	10
7	What is the necessity of starter in dc motor. Explain briefly about the operation of 4-point starter with neat diagram.	10