4TH SEM./ ELECTRICAL /2024(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. Define ratio error in potential transformers.

b. What is the significance of back emf in DC motor running?

c. What is the role of Buchholz relay in transformer?

d. State the voltage equation of DC motor and also the condition for maximum mechanical power developed.

e. What are the two effects of the armature reaction in DC generator?

f. What is the working principle of a single phase transformer?

g. State two functions of yoke in DC machines.

h. What is the role of equalizer bar in DC series generators connected in parallel?

i. What is 'all day efficiency' in distribution transformers?

j. Why transformer rating is expressed in kVA?

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

a. Describe the short circuit test on a single phase transformer with a neat diagram.

b. Determine the efficiency of DC machine by swinburne's test method.

c. Describe the external characteristics in DC shunt generator.

d. A 230 V dc shunt motor takes 5 A at no load and runs at 1000 rpm. Calculate the speed when loaded and taking a current of 30 A. The armature and field resistances are 0.2 ohm and 230 ohm respectively.

e. Explain the operation of ON Load Tap changer in transformer using resistor transition.

f. Write a short note on current transformer (CT).

g In a 25 kVA, 2000/200 V transformer the iron and copper losses are 250 and 350 W respectively. Calculate the efficiency on UPF at half load.

3	A 200 KVA, 2000/440 V, 50Hz single phase Transformer gave the following Test Result : O.C Test : 2000v, 1.8 A, 1.75KW ..... on HV side S. C Test : 13 V, 300 A, 1KW..... on LV side Obtain the equivalent Circuit as referred to HV side.	10
4	A DC shunt generator has Full Load current of 196A at 220V. The stray losses are 720W and the shunt field coil resistance is 55 ohm. If it has a full load efficiency of 88%, find the armature resistance. Also find the load current corresponding to maximum efficiency.	10
5	Describe the process of commutation in DC Generator along with sketch diagram in details.	10
6	Describe the constructional features and working principle of single phase Auto Transformer.	10
7	A DC series motor drives a load the torque of which varies as the square of the speed. The motor takes a current of 15A when the speed is 600 rpm. Calculate the speed and the current when the motor field winding is shunted by a divertor of the same resistance as that of the field winding. Neglect armature, series winding and brush drops.	10