Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (EE) (2012 Onwards)/(Electrical & Electronics) (2011 Onwards)
B.Tech. (Electrical Engineering & Industrial Control)/(Electronics & Electrical) (2012 to 2017)
(Sem.–3)

TRANSFORMERS AND DIRECT CURRENT MACHINES

Subject Code : BTEE-302
M.Code : 57093

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Q1 Answer briefly :

a) Discuss the working principle of a single phase transformer.

b) What do you mean by voltage regulation of a transformer?

c) Write any two applications of an autotransformer.

d) What are the reasons of higher efficiency of autotransformers as compared to conventional transformers?

e) What are the possible connections for a 3 phase transformer bank?

f) What is armature reaction?

g) What are the different types of DC generators?

h) What is critical field resistance of a DC shunt generator?

i) Explain the working principle of a DC motor.

j) Draw the equivalent circuit of a DC motor armature.

SECTION-B

Q2 The maximum efficiency of a 100 KVA single phase transformer is 98% and occurs at 80% of full load at 0.8 power factor lagging. If the leakage impedance of the transformer is 5%, find the voltage regulation at full load.

Q3 The primary and secondary voltages of an autotransformer are 500V and 400V respectively. Show with the help of a diagram the current distribution in the windings when the secondary current is 100 A. Also calculate the economy in the conductor material.

Q4 Explain the short circuit and open circuit tests on a three winding transformer.

Q5 Define Commutation. Explain the process of commutation in DC generators with neat sketches.

Q6 Explain the principle of torque production in a DC motor. Also derive the torque equation for a DC motor

SECTION-C

Q7 Define Transformer Efficiency and find out the condition for maximum efficiency. A single phase transformer working at unity power factor has an efficiency of 90% at both half load and at full load of 500 W. Determine the efficiency at 75% full load and the maximum efficiency.

Q8 Derive the expression for finding out the EMF equation of a DC machine. An 8 pole lap connected armature has 40 slots with 12 conductors per slot generates a voltage of 500V. Determine the speed at which it is running if the flux per pole is 50 mWb.

Q9 Discuss the different methods of speed control of a DC motor.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.