

School of Engineering**B.TECH Electrical Engineering
Semester End Examination - Jun 2024****Duration : 180 Minutes
Max Marks : 100****Sem IV - G2UB402B - Electrical Machine I**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Compare core type and Shell type Transformer. K1(2)
- 2) Explain the different losses occur in dc machine. How the magnetic losses are minimized in dc machine? K2(4)
- 3) Why is electric braking of electric motor superior to mechanical braking? How is dynamic braking of D.C shunt motor done? K2(6)
- 4) A Shunt generator delivers 195A at terminal Voltage of 250V. The armature resistance and shunt Field resistances are 0.02 Ω and 50 Ω respectively. The iron and friction losses equal 950W. Find (a) EMF generated (b) Copper losses (c) output of the prime mover (d) commercial, mechanical and electrical efficiencies. K3(9)
- 5) A 240V DC series motor takes 40A when giving its rated output at 1500 rpm. Its armature resistance is 0.3 Ω . What should be the external resistance required to be added to obtain rated torque at 1000 rpm? K3(9)
- 6) Discuss construction, working and application of CT and PT with neat diagram. K5(10)
- 7) A 400 V series motor has a total armature resistance of 0.25 Ω . When running at 1200 rpm it draws a current of 25 A. When a regulating resistance of 2.75 Ω is included in the armature circuit, it draws current of 15 A. Find the speed and ratio of the two mechanical outputs. Assume that the flux with 15 A is 70% of that with 25 A. K4(12)
- 8) Explain with reasons why a Δ - Δ transformer cannot be paralleled with a Δ -Y transformer. The efficiency of a 1000 kVA, 110/220 V, 50 Hz, single-phase transformer is 98.5% at half full-load at 0.8 pf leading and 98.8% at full-load upf. Determine: (a) iron-loss, (b) full-load copper loss, and (c) maximum efficiency at upf. K5(15)
- 9) What are the advantages of V-V connections of transformer? A 100 K5(15)

kVA, 1100/230 V, 50-Hz transformer has an HV winding resistance of 0.1 W and a leakage reactance of 0.4 W . The LV winding has a resistance of 0.006 W and a leakage reactance of 0.01 W . Determine the equivalent winding resistance, reactance and impedance referred to the HV and LV sides. Convert these to pu values.

- 10) Predict the various losses in the transformer? A 3-phase bank of three single-phase transformer are fed from 3-phase 33 kV (line-to-line). It supplies a load of 6000 kVA at 11 kV (line-to-line). Both supply and load are 3-wire. Calculate the voltage and kVA rating of the single-phase transformer for all possible 3-phase transformer connection.

K6(18)