EEE/ETI 3105 CAT 2 15/07/2025

(a) A 20kVA single phase transformer has voltage rating of 1100/110V. During short circuit test it gives the following readings, 60V, 18A, 560W L.V. side shorted. Determine the power factor at which the regulation is zero, on load.

[10 Marks]

(b) A 200 kW, 400 V, separately excited dc motor runs at 600 rpm. It has 864 lap-connected conductors. The full load armature copper loss is 8 kW. Draw the connection diagram of the motor and calculate the useful flux/pole.

[7 Marks]

(c) A d.c. series generator has armature resistance of 0.5 Ω and series field resistance of 0.03 Ω. It drives a load of 50A. If it has 6 turns/coil and total 540 coils on the armature and is driven at 1500rpm, calculate the terminal voltage at the load. Assume 4 poles, lap type winding, flux per pole as 2mWb and total brush drop as 2V. ***[6 Marks]***

(d) A 215 V dc machine has an armature resistance of 0.4 Ω. It is supplying 5 kW as a generator when run at 1000 rpm and is excited to give a terminal voltage of 215 V. At what speed would it run as a motor if it is fed at the same terminal voltage, draws the same armature current, but the flux/pole is increased by 10%? ***[7 marks]***

.....THE END.....