PEC
EXPLORE INNOVATE EXCEL

Punjab Engineering College, Chandigarh
End-Term Examination

Programme: **B.E (Electrical Engineering)**
Course Name: Electrical Machines-I
Maximum Marks: 70

Year/Semester: 2021/3rd
Course Code: **EL-1003**
Time allowed: **2 Hours**

- All questions are compulsory. Each question carries 10 marks.
- Attempt the questions in sequence only.

Q.No	
1.	Two coils having 100 and 150 turns respectively are wound side by side on a closed iron circuit of section 125 cm^2 and mean length 200 cm. If the permeability of iron is 2000, calculate: a) Self-inductance of each coil b) Mutual inductance between them c) EMF induced in the second coil if current in the first coil changes from 0 to 5A in 0.02 sec.
2.	Explain the different types of three-phase transformer connections. Also mention their applications and limitations.
3.	A 220 V DC shunt motor with an armature resistance of 0.5 ohm is excited to give constant main field. At full load, the motor runs at 500 rpm and takes an armature current of 30 A. If a resistance of 1 ohm is placed in the armature circuit, find the speed at: (a) Full load torque (b) Double full-load torque.
4.	What is the need for Scott connection of a transformer? Explain the three-phase to two-phase conversion using this connection along with suitable diagrams.
5.	Two 100 kW transformers each has a maximum efficiency of 98% but in one, the maximum efficiency occurs at full load, while in the other, it occurs at half load. Each transformer is on full load for 4 hours, on half-load for 6 hours and one-tenth load for 14 hours per day. Determine the efficiency of the transformer.
6.	Two shunt generators operating in parallel deliver a total current of 250 A. One of the generators is rated 50 kW and the other 100 kW. The voltage rating of both the machines is 500 V and have regulation of 5% (smaller one) and 4%. Assuming linear characteristics, determine: (a) the current delivered by each machines (b) terminal voltage.
7.	A DC series motor drives a load, the torque of which varies as the square of speed. The motor takes a current of 15 A when the speed is 600 rpm. Calculate the speed and current when the motor field winding is shunted by a diverter of same resistance as that of field winding. Mention the assumptions made, if any.