Code No: 133AM

Time: 3 hours   **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Explain the different methods of excitation of DC generators with suitable diagrams.
  b) A long shunt d.c. compound generator has an armature, series field and shunt field resistances of 0.04Ω, 0.03Ω and 200Ω respectively. It supplies a load current of 180A at 400V. Calculate the generated emf. Assume contact drop/brush =1.2V.   [8+7]

2.a) Explain the following methods of improving commutation:
  i) Resistance commutation   ii) E.m.f. commutation
  b) A 6 pole lap connected 230V dc shunt motor has 410 armature conductors. It takes 42 A on full load. The flux per pole is 0.05 weber. The armature and field resistances are 0.1Ω and 230Ω respectively. Contact drop per brush = 1.2V. Determine the speed of motor at full load.   [8+7]

3.a) Derive the torque developed in a DC Motor.
  b) A 220 V DC Shunt motor draws a no – load armature current of 3 A when running at 1400 rpm. Determine its speed when taking an armature current of 65A, if armature reaction weakens the flux by 3.2%. Take armature resistance as 0.25Ω.   [8+7]

4.a) Explain the working of a three point starter with a neat connection diagram.
  b) Derive the condition for maximum efficiency for a DC generator or DC Motor.   [8+7]

5.a) Explain how the efficiency can be predetermined by using Swinburne's Test on a DC Shunt machine .
  b) The voltage per turn of a single phase transformer is 1.1 V. When the primary winding is connected to a 230V, 50Hz AC supply, the secondary voltage is found to be 550V. Find:
  i) the primary and secondary turns, ii) Core area if the maximum flux density is 1.2 Tesla.
                [8+7]

6.a) Distinguish between a core type and Shell type transformer.
  b) Derive the condition for maximum efficiency of a Single Phase transformer.   [8+7]

7.   The number of turns on the primary and secondary windings of a transformer are 1200 and 300 respectively. When the load current on the secondary is 120A at 0.85 power factor lagging, the primary current is 32 A at 0.72 power factor lagging. Determine the no-load current of the transformer and its phase with respect to the voltage.   [15]

8.a) Explain the concept of parallel operation of a Single – phase transformers.
  b) The primary and secondary resistances of a 1100/220V transformer are 0.32 Ω and 0.0198 Ω respectively. If iron loss amounts to 300W, determine the secondary current at which maximum efficiency occurs and find the maximum efficiency at 0.82 power factor.
                [7+8]

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