BT-4/M-20   **34012**
ELECTRICAL MACHINES-II
EE-210E (Opt. ii)

Time : Three Hours]   [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least question from each Section.

Section A

1. (a) Define the following :
Coil pitch, Distribution factor, Pitch factor, Pole pitch.   **12**

(b) Explain electromagnetic and reluctance torque.

2. Draw neatly the waveforms on simultaneous scale :
$V_1 = V_m \sin \omega t$, $V_2 = V_m(\sin \omega t - 120º)$, $V_3 = V_m(\sin \omega t - 240º)$. Hence, explain: A 3-phase pulsating flux is equivalent to a bipolar rotating magnetic flux with neat sketches. Explain in brief, the cause of rotation of rotor in a 3-phase squirrel cage Induction motor.

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Section B

3. (a) Describe with a neat sketch, the principle and wroking of a star-delta starter. **15**

 (b) A 3-phase IM has starting torque 100% and a maximum torque of 200% of full load torque. Find slip at maximum torque. **5**

4. (a) Explain torque slip characteristic of 3-phase induction motor. **15**

 (b) Develop the equivalent circuit for a 3-phase induction motor. **5**

Section C

5. (a) Explain double revolving field theory. **10**

 (b) Explain the working of a capacitor start single-phase I.M. with a neat diagram. **10**

6. (a) Explain the following :
 Breakdown torque, centrifugal switch, negative slip and rated torque. **12**

 (b) Why is capacitor start motor better than the resistance split phase motor ? Explain **8**

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Section D

7. Explain in detail parallel operation of alternators with reference to synchronization and load divisions with neat diagrams. **20**

8. (a) A 3600 r.p.m., 60 Hz, 13.8 kV synchronous generator has a synchronous reactance of 2.0 Ω operating at rated voltage and speed with the excitation voltage E_f = 11.5 kV and the torque angle δ = 15º.

Calculate (i) stator current, (ii) power factor, and (iii) total output power. **9**

(b) What is synchronous capacitor ? Compare it with a synchronous motor. **6**

(c) Explain the importance of 'V' curves. **5**