

Total No. of Questions : 8]

SEAT No. :

PA-1458

[Total No. of Pages : 2

[5926]-74

**T.E. (Electrical Engineering)**  
**ELECTRICAL MACHINES - II**  
**(2019 Pattern) (Semester - I) (303143)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable data, if necessary.
- 5) Use of non-programmable calculator is allowed.

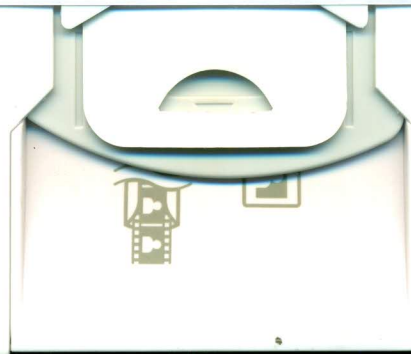
- Q1)** a) State different methods of starting 3 phase synchronous motor. Explain any one. [4]
- b) Explain operation of synchronous motor at constant load and variable excitation using appropriate phasor diagrams. [6]
- c) A 3 phase star connected, 6.6 kV synchronous motor takes 72A at 0.8A leading power factor. Resistance and reactance per phase of the motor are 0.1 ohm and 0.9 ohm respectively. Determine e.m.f. induced and total power input. [8]

OR

- Q2)** a) Draw power flow diagram of 3 phase synchronous motor with appropriate nomenclature. [4]
- b) Compare 3 phase induction motor with 3 phase synchronous motor. [6]
- c) Draw the schematic diagram of synchronous induction motor & explain its working. How it is superior to synchronous motor. [8]
- Q3)** a) What are the various methods of speed control of 3 phase induction motor? [3]
- b) Explain speed control of 3 phase induction motor by (V/f) method. Draw the circuit diagram of the experiment with conclusion. [6]
- c) Write a short note on 3 phase induction generator. [8]

OR

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- Q4)** a) What is Energy efficient induction motor? State the factors which are to be improved for energy efficiency? [3]  
b) Write a short note on brushless D.C. motor. [6]  
c) Explain construction and working of permanent magnet D.C. motor with suitable diagram. Also state its applications. [8]

- Q5)** a) List the problems experienced by D.C. series motor operated on A.C. supply. [4]  
b) Compare the conductively & inductively compensated AC series motor. [6]  
c) What are the various methods of improving commutation in series motor? Explain the use of composites in detail. [8]

OR

- Q6)** a) Draw performance characteristics curves of universal motor. Label the curves and axis. [4]  
b) Compare performance of universal motor on AC and DC supply. [6]  
c) A series motor having resistance  $30 \Omega$  & inductance  $0.5 \text{ H}$  when connected to  $250 \text{ V DC}$  supply draws a current of  $0.8 \text{ A}$  and run at  $2000 \text{ rpm}$ . If it is supplied by  $250 \text{ V, } 50 \text{ Hz AC}$  supply with same loading. The rotational loss is  $15 \text{ W}$ . Calculate (i) speed (ii) power factor (iii) Gross power developed and (iv) efficiency. [8]

- Q7)** a) Classify single phase induction motors. [3]  
b) Explain the tests to determine the parameters of a equivalent circuit of a single phase induction motor. Draw circuit diagram for the test. [6]  
c) Explain double field revolving theory of a single phase IM. Draw its speed-torque characteristics. [8]

OR

- Q8)** a) Elaborate the reason for single phase motor not self-starting. [3]  
b) Compare single phase motor with 3 phase motor. [6]  
c) Explain construction and working of split phase induction motor. Draw its torque-speed characteristics. State its two applications. [8]

