Code No: 54012 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, August/September - 2022
ELECTRICAL MACHINES – II
(Electrical and Electronics Engineering)

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

Answer any five questions
All questions carry equal marks
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1.a) Explain the principle of operation of a 1-ϕ transformer.
b) The primary winding of a 1-ϕ transformer is supplied from a 415 V, 50 Hz source and has 200 turns. Find the i) peak value of flux and ii) voltage induced in the secondary winding if it has 50 turns. [7+8]

2.a) Obtain an equivalent circuit of a 1-ϕ tansformer.
b) The efficiency of a 10 KVA, 2000/ 400 V single – phase transformer at unity power factor is 97% at rated load and also at half rated load. Determine the transformer core losses and ohmic losses. [7+8]

3.a) List and explain the various losses that occur in a transformer.
b) Define an auto-transformer. State its merits and demerits over a two-wining transformer. What are the applications of an auto transformer? [7+8]

4.a) What are the advantages of a single three-phase transformer over three single-phase transformer banks of the same KVA rating?
b) Explain the open-delta connection with a suitable diagram. What are the uses of this connection? [7+8]

5.a) Explain the constructional aspects of Induction machines.
b) The frequency of the emf in the stator of a four pole induction motor is 50 Hz, and that in the rotor is 2 Hz. What is the slip and at what speed is the motor running? [7+8]

6. A 8 pole, 50 Hz, three phase induction motor has rotor input of 100 KW on full load. The rotor emf makes 120 cycles per minute. Determine a) rotor speed in rpm b) rotor copper loss, c) mechanical power developed, and d) rotor resistance per phase if rotor current is 80 A per phase. [15]

7.a) Explain the working of Y-Δ starter used in 3-ϕ I.M.
b) A 3 phase, 8 pole 50 Hz induction motor has a full load slip of 1.5 %. The rotor resistance is 0.001Ω/phase and the standstill reactance is 0.005Ω/phase. Calculate the ratio of the maximum to full load torque, and the speed at which maximum torque takes place.[8+7]

8. Write short notes on the following:
a) Methods of speed control of three phase induction motor
b) Working principle of Induction generator. [8+7]

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