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Code No: 154AU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, August/September - 2021

ELECTRICAL MACHINES – II
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. Describe constructional features of both squirrel cage induction motor and slip ring induction motor. Discuss the merits of one over another. [15]
- 2.a) Describe how 3-phase supply produces a rotating magnetic field of constant value at constant speed with vector diagram?
b) A 4-pole three phase 50 Hz Induction motor has a star connected rotor. The rotor has a resistance of 0.1 ohms per phase and standstill reactance of 2 ohms per phase. The induced emf between the slip rings is 100V. Its full load speed is 1460rpm, find i) slip, ii) rotor frequency, iii) rotor current, iv) rotor power factor on full load condition. Assume slip rings are shorted. [8+7]
- 3.a) Explain the working principle of induction generator.
b) A 4-pole, 451V, 50Hz star connected, 3-phase induction motor has stator impedance of $(0.8+j2.4)$ ohms per phase and equivalent standstill rotor impedances of $(1.0+j2.2)$ ohms per phase. Find the maximum torque that the motor can develop and the slip at which it occurs? [7+8]
4. Derive the equation for torque developed by an induction motor. Draw a typical torque-slip curve and deduce the condition for maximum torque. [15]
- 5.a) Explain the two reaction theory of synchronous machines.
b) A 3-phase, 6 pole star connected alternator revolves at 1000rpm. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05wb. Calculate the voltage generated by the machine if the winding factor is 0.96. [8+7]
6. Explain the procedure of POTIER method to calculate voltage regulation of an alternator. [15]
- 7.a) Bring out the requirements for two alternators to be working in parallel.
b) Explain the principle of operation of synchronous motor. [8+7]
8. Explain the working principle of single phase induction motor with the help of double field revolving theory. [15]

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