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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.   Describe the principle of operation and working of a 3-phase induction motor with a neat sketch?   [15]

2.a)   Describe constructional features of squirrel cage induction motor?
  b)   A three phase induction motor is supplied at 50 Hz and is wound for 4 poles. Calculate (i) synchronous speed, (ii) speed when the slip is 3% (iii) frequency of the rotor emf when it runs at 1200 rpm.   [8+7]

3.a)   Draw and explain the equivalent circuit of a 3-ϕ induction motor.
  b)   Explain the principle of operator of Induction generator.   [8+7]

4.a)   Explain about crawling and clogging incase of 3-phase Induction Motor.
  b)   A 50 Hz 8 pole 3-phase induction motor has a full load slip 4%. The rotor resistance and standstill reactance are 0.001 Ω and 0.005 Ω respectively per phase. Find the ratio of maximum torque to full load torque and the speed at which the maximum torque occurs.
                                                                                                          [8+7]

5.a)   Derive the emf equation of an alternator.
  b)   A 3-phase 50 Hz star connected alternator has 180 conductors per phase and flux per pole is 0.0543 Wb. Find i) e.m.f generated per phase and ii) e.m.f between line terminals. Assume the winding to be full pitched and distribution factor to be 0.96.   [8+7]

6.a)   What is the effect of armature reaction at different power factors in synchronous machine? Explain.
  b)   Find the voltage regulation at full load, 0.8 power factor lagging for a 3-phase, 1500 kVA, 6600V, star connected alternator having an armature resistance of 0.093ohms/phase and synchronous reactance of 8.5ohms/phase.   [8+7]

7.   Discuss the various methods of starting and procedure for starting synchronous motor.
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8.   What are the types of single phase induction motor? Explain the working of any two in detail.   [15]

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