NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: B.Tech EEE
Year: 2nd **Semester:** 4th
Examination: End Semester Examination
Examination year: May 2023

Course Code: EE 211 **Course Name:** Electrical Machine II
Date: 16/5/2023
Time: 10:00 am to 12 noon

Total Marks: 40
Total Pages:

Instructions:

→ Write each answer on a new page.
→ Use of a calculator is permitted/not permitted.
→ * COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No. I	Attempt any Six	Marks	COs*	BTL#
Q.1	What is the necessity of starters in Induction motor? Explain star-delta starter with diagram.	5	CO1 CO2	BT1 BT2
Q.2	How to control the speed of three phase Induction motor? Explain different method of speed control from stator side.	5	CO1 CO2	BT1 BT3 BT6
Q.3	Explain the working principle and construction of three phase Alternator with relevant diagram.	5	CO3 CO4	BT3 BT4
Q.4	Derive the Equation of Induced E.M.F of three phase alternator.	5	CO3 CO4	BT1 BT2
Q.5	A 6-pole, 3-phase induction motor develops a power of 22.38kW, including mechanical losses which total 1.492 kW at a speed of 950 rpm on 550-V, 50-Hz mains. The power factor is 0.88. Calculate for this load (a) the slip (b) the rotor copper loss (c) the total input if the stator losses are 2000 W (d) the efficiency (e) the line current (f) the number of complete cycles of the rotor electromotive force per minute.	5	CO2	BT2 BT3 BT4
Q.6	The following test results are obtained from a 3-phase, 6,000-kVA, 6,600 V, star-connected, 2-pole, 50-Hz turbo-alternator: With a field current of 125 A, the open-circuit voltage is 8,000 V at the rated speed; with the same field current and rated speed, the short-circuit current is 800 A. At the rated full-load, the resistance drop is 3 per cent. Find the regulation of the alternator on full-load and at a power factor of 0.8 lagging.	5	CO3 CO4	BT2 BT3 BT4
Q.7	The stator of a 3-phase, 16-pole alternator has 144 slots and there are 4 Conductors per slot connected in two layers and the conductors of each phase are connected in series. If the speed of the alternator is 375 r.p.m., calculate the e.m.f. inducted per phase. Resultant flux in the air-gap is 5×10^{-2} wb per pole sinusoidally distributed. Assume the coil span as 150° electrical.	5	CO3 CO4	BT2 BT3 BT4

| Q. No. II | Draw the circle diagram from no-load and short-circuit test of a 3-phase. 14.92 k W, 400-V, 6-pole induction motor from the following test results (line values). No-load : 400-V, 11 A, p.f. = 0.2 Short-circuit : 100-V, 25 A, p.f. = 0.4 Rotor Cu loss at standstill is half the total Cu loss. From the circle diagram, find line current, slip, efficiency and p.f. at full-load condition. | 10 | CO2 | BT2, BT3, BT4 BT 6 |

***********End of Question Paper***********