B.TECH: FOURTH (END SEMESTER)
SUBJECT: ELECTRICAL ENGINEERING   **SUBJECT CODE:** EE-202,
DEPTT CODE: EE
FULL MARKS: 100   **DISCIPLINE:** ME, ECE & EIE
Duration of Examination: 3 hours
This question paper contains **Two** pages,
All parts of a question should be answered at one place.

Answer any Ten questions: (10*10=100)

Q1/ The efficiency at unity pf, of a 6600/384 V, 200 KVA single phase transformer is 98% at full load and half load. The pf on no load is 0.2 and full load regulation at a lagging pf of 0.8 is 4%. Insert all values of resistance and reactance on the LV (secondary) side.

Q2. Explain clearly the phasor diagrams when a single phase transformer supplies power to a) an inductive load ii) resistive load iii) a capacitive load.

Q3. A 3 phase star connected alternator is rated at 1600 KVA, 13500 V. The armature effective resistance & synchronous reactance per phase are 1.5 ohms & 30 ohms respectively. Calculate the percentage regulation for a load of 1280 KW at p.f. of i) 0.85 lagging ii) unity ii) 0.95 leading.

Q4/ Starting from the magneto motive forces, establish the relationship between the no-load excitation voltage per phase, full-load terminal voltage per phase & the synchronous impedance per phase for a 3 phase alternator All the steps in the derivation should be clearly shown.

Q5 A 3 phase 8 pole 750 rpm star connected alternator has 72 slots on the armature. Each slot has 12 conductors and winding is short chorded by 2 slots. Find the induced emf between lines, given the flux per pole is 0.06 Wb.

Q6, A 400 V, 6 pole DC shunt motor has A=2, Z=250. The armature winding resistance is 0.3 ohm , field winding resistance is 200 ohms and the Flux per pole is 0.04 Wb. Find the speed and the Electromagnetic torque developed if the motor draws 10 A from the supply.

[P.T.O]

Q7. A 10 kW, 240 V DC shunt motor draws a line current of 5.2 A while running at no-load speed of 1200 rpm from a 240 V DC supply. It has an armature resistance of 0.25 ohm and a field resistance of 160 ohm. Estimate the efficiency of the motor when it delivers rated load

Q8. A) Explain the Ward-Leonard control of DC motor speed control with neat sketch. Discuss its advantages (05)

B) Explain the Slip-Torque characteristics of 3-Φ Induction motor with graphical illustrations (05)

Q9. A 3-Φ 400 V, 50 Hz induction motor takes a power input of 35 kW at its full load speed of 980 rpm. The total stator losses are 1 kW and mechanical losses are 1.5 kW. Calculate a) Slip b) Rotor ohmic losses c) Shaft power d) Shaft torque e) Efficiency

Q10. Explain the various types of starting methods of 3-Φ Squirrel cage Induction motor with neat sketch.

Q11. Write short notes on the following (4*2.5=10)

A) Y/Δ Connection for a three phase transformer
B) Pitch factor and Distribution factor
C) In 3-Φ induction motor, Rotor Cu. Loss= S * Air-gap Power". Justify the statement
D) Assign the mode of operation of 3-Φ induction motor for the following values of slip (S)

a) S=0   b) 0<S<1   c) S<0   d) S=1   e) S>1

************All the Best******************