

Code No: 124AB**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, March - 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 constructional details of single phase transformers.
- b) Derive the e.m.f equation of a 1- ϕ Transformer. [8+7]
- 2.a) How the iron loss vary with the change in supply frequency in transformers? Explain.
- b) An ideal transformer has 200 primary turns and 360 secondary turns, the primary being excited at 600 V. The full secondary has a resistive load of 8 kW. The secondary is also tapped at 240 turns which supplies a pure inductive load of 10 kVA. Find the primary current and its pf. [8+7]
- 3.a) Discuss in detail about open circuit test in single phase transformers.
- b) Two single-phase transformers operate in parallel to supply a load of $(40 + j 18) \Omega$. The transformer A has a secondary emf of 600 V on open circuit with an internal impedance of $(1.8 + j 5.6) \Omega$ referred to the secondary. The corresponding figures for transformer B are 610 V and $(1.8 + j 7.4) \Omega$. Calculate the terminal voltage, current and power factor of each transformer. [7+8]
- 4.a) What are the advantages and disadvantages of Sumpner's test? Explain.
- b) A 50 kVA, 2300 V/230 V transformer draws power of 750 W at 0.5 A at no load when 2300 V is applied to the HV side. The HV winding resistance and leakage reactance are 1.8Ω and 4Ω respectively. Calculate the no load pf and the primary induced emf. [8+7]
- 5.a) Compare the features of two winding and auto transformers .
- b) Two transformers each rated 250-kVA, 11/2-kV and 50-Hz are connected in open delta on both the primary and secondary. A delta connected three-phase load of 250 kVA, 0.8 pf, 2 kV is connected to the low-voltage terminals of this open-voltage transformer. Determine the transformer currents on the 11 kV side of this connection. [8+7]
- 6.a) Discuss about the switching transients in transformers.
- b) The HV terminals of a 3-phase bank of three single-phase transformers are connected to a 3-wire, 3-phase, 11 kV (line-to-line) system. The LV terminals are connected to a 3-wire, 3-phase load rated of 1000 kVA and 2200 V line-to-line. Specify the voltage, current and kVA ratings of each transformer (both HV and LV windings) if HV is delta connected and LV is star connected. [7+8]

- 7.a) Discuss in detail about the working principle of induction motors.
- b) Determine the slip at maximum torque and ratio of maximum to full load torque for a 3 phase star connected 6.6 kV, 20 pole, 50 Hz induction motor has rotor resistance of 0.12Ω and standstill reactance of 1.12Ω . The motor speed at full load is 292.5 rpm. [8+7]
- 8.a) Explain in detail about the principle of operation of induction generator.
- b) A squirrel-cage induction motor has a full load slip of 4% and a blocked-rotor current of six times the full-load current. Find the percentage of tapping of the autotransformer starter to give full-load torque on starting and the line current as a percentage of full-load current. [8+7]

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