

SIDDAGANGA INSTITUTE OF TECHNOLOGY-TUMAKURU

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Sub: Introduction to Electrical Engineering (IEE)(ESC02)

Date: 20/12/2024

Sem/Sec: I-M-Section

Total Marls: 20

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1	A 500V dc shunt motor has 4 poles and wave connected winding with 492 conductors., the flux per pole is 0.05wb.The full load current is 20 A. The armature and shunt field resistances are 0.1Ω and 250Ω respectively. Calculate the speed and developed torque.
2.	A 4 pole,220V, lap connected dc shunt motor has 36 slots with each slot containing 16 conductors. The line current is 40A. The field resistance and armature resistances are 110Ω and 0.1Ω respectively. The motor develops an output power of 6 KW. The flux per pole is 40 mwb. Calculate a) The Speed b) Torque developed by armature.
3.	The armature of shunt motor has a lap winding accommodated in 60 slots, each containing 20 conductors. If the useful flux per pole is 28 mWb, calculate the total torque developed in N-m when the armature current is 50A.
4	A DC shunt generator supplies a load of 30kW at 300V to a load through a pair of feeders each having a resistance of 0.2Ω . $R_a=0.1\Omega$ $R_{sh}=100\Omega$.Find the terminal voltage and induced E.M.F in the generator.
5.	A DC shunt generator with armature resistance and shunt field resistance of 0.5 ohm and 100 ohm respectively has a no load voltage of 300 V. What is the power delivered to the load when the load current is 10A? Allow brush drop of 2V on load
6	A 4 pole, 250V dc series motor has wave connected armature with 1254 conductors. The flux per pole is 22 mWb, when the motor is taking 50A. The resistance of armature and series field winding are 0.3Ω and 0.2Ω respectively. Calculate the speed and torque of the motor and also the power developed in Watts.
7	The four pole lap connected DC motor has 576 conductors and draws an armature current of 10A. If the flux per pole is 20 mWb, calculate the armature torque developed in N-m.
8	A 1- transformer has 400 primary and 1000 secondary turns. The net cross sectional area of the core is 60 cm^2 . If the primary winding is connected to a 500V A.C. supply at 50 Hz, Calculate the value of B_{MAX} in the core & the EMF induced in the secondary winding.
9	The primary winding of 25KVA transformer has 200 turns and is connected to 230V, 50Hz supply. The secondary turns are 50. Calculate (i) No load secondary Induced emf (ii) Full load primary and secondary current (iii) The flux density in the core, if the cross section area of the core is 60 cm^2 .
10	A 250 kVA, 11000/415V, 50Hz, single phase transformer has 80 turns on the secondary. Calculate (i) rated primary and secondary currents (ii) the no. of primary turns (iii) the maximum value of the flux (iv) EMF induced per turn
11	A 500 kVA transformer has an efficiency of 92% at full load, unity power factor and at half full load 0.9 power factor. Determine its efficiency at 80% of the full load and 0.9 power factor.
12	A delta connected load consists of a resistance of 10Ω and a capacitance of $100\mu\text{F}$ in series in each phase. A 3-phase ac supply of 410V at 50 Hz is applied to the load. Find the line current, power factor and power consumed.
13	In a 25 kVA, 2000/200 V, single phase transformer, the iron losses and full load copper losses are 350 W and 400 W respectively. Calculate the efficiency of the transformer at i) Full load, 0.8 PF ii)

	Half full load, 0.8 PF.
14	A 3 ϕ IM has 6 poles and runs at 960 rpm on full load. It is supplied from an alternator having 4 poles and running at 1500 rpm. Calculate full load slip and frequency of rotor current.
15	A 3 ϕ IM 4 pole, 440 V, 50 Hz, IM runs at 1440 rpm. Find the percentage slip and synchronous speed. What is the frequency of Induced current?
16	A 4 pole 50Hz, 3-phase Induction motor has a slip of 1% at no load. When operated at full load, the slip is 2.5% Find the no-load and full load speeds. What is the total change in rpm from Noload to full load.