

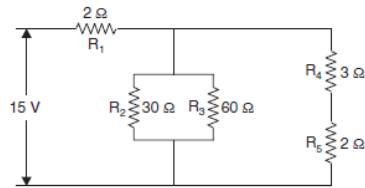
II B. Tech I Semester Regular Examinations, March - 2021
ELECTRICAL SYSTEMS
 (Agricultural Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
 All Questions carry **Equal** Marks

- 1 a) State and explain thevenin's theorem [7M]
 b) For the following Series parallel circuit. Find i)the total resistance of the circuit [8M]
 and ii)the total current flowing through the circuit



Or

- 2 a) State and explain Kirchoff's laws [7M]
 b) A resistance 12Ω , an inductance of 0.15 H and a capacitance of $100 \mu\text{F}$ are connected in series across a 100 V , 50 Hz supply. Calculate: (i) The current. [8M]
 (ii) The phase difference between current and the supply voltage.(iii) Power consumed.
- 3 a) Explain the principle of operation of a transformer with a neat diagram [7M]
 b) A single-phase transformer is connected to a 230 V , 50 Hz supply. The net cross-sectional area of the core is 60 cm^2 . The number of turns in the primary is 500 and in the secondary 100. Determine:(i) Transformation ratio. (ii) Maximum value of flux density in the core.(iii) E.m.f. induced in secondary winding [8M]

Or

- 4 The following readings were obtained from O.C. and S.C. tests on 8 kVA [15M]
 $400/120 \text{ V}$, 50 Hz transformer.
 O.C. test (l.v. side): 120 V ; 4 A ; 75 W .
 S.C. test (h.v. side): 9.5 V ; 20 A ; 110 W .
 Calculate :(i) The equivalent circuit (approximate) constants,
 (ii) Voltage regulation and efficiency for 0.8 lagging power factor load
- 5 a) Explain the constructional aspects of the DC Generator with a neat diagram and required labeling of main parts [8M]
 b) A shunt generator supplied 500 A at 500 V . Calculate its generated e.m.f. if its armature and shunt field resistances are 0.02Ω and 125Ω respectively [7M]

Or

- 6 a) Explain the significance of back emf or counter emf in a DC Motor [7M]
 b) A 250 volt d.c. shunt motor, on no load, runs at 1000 rpm and takes 5 A . The field and armature resistances are 250 ohms and 0.25 ohm respectively. calculate the speed when the motor is loaded such that it takes 41 A if the armature reaction weakens the field by 3% . [8M]

- 7 a) Explain the various speed control methods of DC Shunt Motor [7M]
b) A 220 V D.C. shunt motor draws a no-load armature current of 2.5 A when running at 1400 r.p.m. Determine its speed when taking an armature current of 60 A, if armaturereaction weakens the flux by 3 per cent. [8M]
- Or
- 8 a) Explain in detail about the Double revolving field theory [7M]
b) A three phase, 6 KW induction motor has a power factor of 0.72 lagging. A bank of capacitors is connected in delta across the supply terminals and power factor is raised to 0.9 lagging. Determine the KVAR rating of the capacitors connected in each phase. [8M]
- 9 a) List the advantages of a Three Phase systems [7M]
b) Two single-phase wattmeters are used to measure three-phase power. The readings of the two wattmeters are 2000 W and 400 W, respectively. Calculate the power factor of the circuit. What would be the power factor if the reading of the second wattmeter is negative? [8M]
- Or
- 10 a) Explain the constructional details of a Three – phase Induction motor [7M]
b) A six-pole, three-phase, 400 V, 50 Hz induction motor is running at a speed of 940 rpm. Calculate its slip. [8M]

