Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X 60439

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020

Third Semester

Electronics and Communication Engineering

EC 2201/EC 32/080290008 – ELECTRICAL ENGINEERING

(Regulations 2008)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Define commutation of a dc machine.
2. What are the parameters that could be found using Brake test and Swinburne's test ?
3. Write down the e.m.f. equation of a transformer.
4. Define voltage transformation ratio of transformer.
5. Draw the equivalent circuit of a induction motor with respect to primary.
6. How the direction of rotation of a 3 phase induction motor could be reversed ?
7. Write down the relation between speed and frequency.
8. Define voltage regulation of an alternator.
9. What are the components of electric power system ?
10. What are the types of insulators ?

PART – B **(5×16=80 Marks)**

11. a) i) A 240 V DC shunt motor has an armature resistance of 0.5 Ω and field resistance of 120Ω. This motor drives a constant torque load and takes an armature current of 22 A at 850 rpm. If the motor speed is to be raised to 1000 rpm from 850 rpm. Find the resistance that must be inserted in the shunt field circuit. Assume magnetization curve to be straight line. **(8)**

ii) Draw the schematic diagram of 3 point starter and explain its working principle. **(8)**

(OR)

b) i) A 4 pole DC motor runs at 600 rpm on full load and takes 25 A, 450 V, the armature is lap wound with conductors and flux per pole is given by $\phi = (1.7 \times 10^{-2})I^{0.5}$ Wb, where I is the motor current. If the supply voltage and torque are halved, calculate the speed at which the motor will run. Neglect stray losses. **(8)**

ii) Discuss various speed control techniques of DC machines. **(8)**

12. a) Draw and explain the no-load phasor diagram and equivalent circuit of a single-phase transformer.

(OR)

b) Explain in detail the O.C. test and S.C. test on a single-phase transformer and what are the informations that can be obtained from the above tests ?

13. a) i) Explain about the construction and working operation of three phase induction motor. **(8)**

ii) Draw the equivalent circuit and performance calculation of three phase induction motor. **(8)**

(OR)

b) i) Explain about principle and operation of single phase induction motor. **(8)**

ii) A 3-phase 400 V, star connected induction motor has a star connected rotor with a stator to rotor turn ratio of 6.5. The rotor resistance and standstill reactance per phase are 0.05 Ω and 0.25 Ω respectively. What should be the value of external resistance per phase to be inserted in the rotor circuit to obtain maximum torque at starting and what will be the rotor starting current with this resistance ? **(8)**

14. a) Explain the construction and working principle of an alternator.

(OR)

b) Explain the construction and working principle of a reluctance motor.

15. a) i) Discuss about any one type of insulators used for overhead lines. **(8)**

ii) Write a note on cables and list out the main requirements of the insulating materials used for cables. **(8)**

(OR)

b) Draw the layout of a typical substation and discuss the role of various equipments in it. **(16)**

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