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Question Paper Code : X67644

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2020.

Third Semester

Electronics and Communication Engineering

EE 1204 – ELECTRICAL ENGINEERING

(Regulations 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the different methods of excitation of Generator?
2. Define back e.m.f of D.C motor.
3. Why transformer rating in KVA?
4. Drive the expression for the voltage transformation ratio.
5. Define 'slip' of an induction motor.
6. Draw the Torque/speed curve of an induction motor.
7. Write down the relation between speed and frequency.
8. Define voltage regulation of an alternator.
9. Name the various conventional and non-conventional energy sources in India for power generation.
10. List the advantages of EHVDC transmission systems.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss about the principle and operation of DC motor. (8)
(ii) A DC series motor drives a load, the torque of which varies as the square of the speed. Assuming the magnetic circuits to be remain

unsaturated and the motor resistance to be negligible, estimate the percentage reduction in the motor terminal voltage which will reduce the motor speed to half the value it has on full voltage. What is then the percentage fall in the motor current and efficiency? (8)

Or

- (b) (i) Explain about the Armature control method of DC shunt motor. (8)
- (ii) A 6-pole, 500V wave connected shunt motor has 1200 armature conductors and useful flux per pole of 20 mWb. The armature and field resistance are 0.5 Ω and 250 Ω respectively. What will be the speed and torque developed by motor when it draws 20 amps from the supply mains? Neglect Armature reaction. If magnetic and mechanical losses amount to 900 W, find (1) useful torque (2) output in kW (3) Efficiency. (8)
12. (a) With necessary vector diagrams, discuss about transformer on no-load and loaded conditions. (16)

Or

- (b) (i) Draw the Equivalent circuit of a transformer with all its notations. (8)
- (ii) Write a note on open circuit test on transformer. (8)
13. (a) With a neat diagram describe the construction of a three phase induction motor and explain the principle of operation.

Or

- (b) (i) Describe the various speed control methods of a three-phase Induction motor. (8)
- (ii) Explain the principle of operation of a single phase Induction motor. (8)
14. (a) (i) The excitation of a 415V, 3 phase, mesh connected synchronous motor is such that the induced emf is 520V. The impedance per phase is $0.5 + j4 \Omega$. If the friction and iron losses are constant at 1000W, calculate power output, line current, power factor and efficiency for maximum power output. (8)
- (ii) Explain about construction and working operation of synchronous motor. (8)

Or

- (b) (i) Explain briefly about hysteresis motor and reluctance motor. (8)
- (ii) Discuss about the types of stepper motor. (8)

15. (a) (i) Explain with a neat diagram, a typical 66/11 KV sub-station. (10)
- (ii) Compare the merits and demerits of underground system versus overhead system. (6)

Or

- (b) (i) What is electric power supply system? Draw a single line diagram of a typical a.c power supply scheme. (8)
- (ii) Discuss the merits and demerits of EMVAC transmission system. (8)
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