

B.E./B.TECH. Degree Examination, December 2020

Third Semester

EE16352 – Electrical Engineering and Instrumentation

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Which of the following is not a part of dc machine?
(a) armature. (b) commutator. (c) field winding. (d) damping winding.
2. A transformer having 1000 primary turns is connected to a 250 V A.C supply. For a secondary voltage of 400V, the number of secondary turns would be
(a) 1600 (b) 250 (c) 400 (d) 1250
3. A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor current will be
(a) 50 Hz
(b) 25 Hz
(c) 5 Hz
(d) 2 Hz
4. In a moving iron meter, the deflecting torque is proportional to
(a) Current through the coil
(b) Square of the current through the coil
(c) Sine of the measurand
(d) Square root of the measurand
5. Explain about back emf in DC motor.
6. Why $V_1:V_2 \neq N_1:N_2$ in a real (practical) transformer?
7. In which type of motor can resistance be introduced in the rotor circuit? What is the effect of it?
8. Compare analog mode of operation with digital mode.

PART B - (4 X16 = 64 marks)

09. (a) Explain the construction of DC generator with a neat diagram and derive its EMF equation. **(16)**
(OR)
(b) (i) Derive the DC motor torque equation. **(8)**
(ii) A 4 pole 900 rpm DC machine has a terminal voltage of 220V and an induced voltage of 240V at rated speed. The armature resistance is 0.2Ω . Is the machine operating as a generator or motor? Compute the armature current and the number of armature coils if the air gap flux/pole is 10mWb and the armature turns per coil are 8. The armature is wave wound. **(8)**
10. (a) Describe in detail about the parts of transformer and its operation. Derive its Emf equation and Transformation Ratio. **(16)**

(OR)

- (b) (i) What are the losses in a transformer? Derive the condition for maximum efficiency? **(8)**
(ii) A single phase transformer has 500 turns in the primary and 1200 turns in the secondary. The cross-sectional area of the core is 80 sq. cm. If the primary winding is connected to a 50 Hz supply at 500 V, calculate (i) Peak flux-density, and (ii) Voltage induced in the secondary. **(8)**

11. (a) Identify why the single phase induction motor is not self-starting and explain any 3 types of induction motor based on starting methods. **(16)**

(OR)

- (b) Derive the following terms in three phase alternator **(16)**
(i) Equation of Induced EMF
(ii) Voltage Regulation

12. (a) (i) Explain the construction and working principle of a LVDT. Also, list out the advantages and disadvantages of LVDT. **(8)**
(ii) Write short notes on (a) Strain Gauge, (b) capacitor microphone **(8)**

(OR)

- (b) Draw the schematic diagram of storage oscilloscope and explain each parts. **(16)**