R16

SET - 1

I B. Tech II Semester Supplementary Examinations, December - 2020
ELECTRICAL AND MECHANICAL TECHNOLOGY
(Com. to ECE, EIE, E Com E)

Time: 3 hours   Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) What is eddy current loss in a transformer? How can this loss be reduced? (3M)

    b) Mention the advantages of having stationary armature and rotating field in a synchronous generator. (2M)

    c) Explain how the range of an ammeter can be extended. (2M)

    d) What is renewable and Non-renewable energy? List out various renewable energy sources. (2M)

    e) What is conduction heat transfer? How does it differ from convective heat transfer? (3M)

    f) Explain the principle of Rolling operation. (2M)

PART -B

2. a) Explain armature voltage control method and field control method for speed control of dc motor. (7M)

    b) An ideal 20kVA transformer has 500 turns on the primary winding and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Calculate (i) primary and secondary currents on full-load (ii) secondary e.m.f. and (iii) the maximum core flux. (7M)

3. a) Explain how regulation of a synchronous generator can be determined using synchronous impedance method. (7M)

    b) A 15 hp, three-phase, four-pole, 50 Hz induction motor has full-load speed of 1455 rpm. The friction and windage loss of the motor at this speed is 600 W. Calculate the rotor copper loss. (7M)

4. a) Explain the constructional details and working principle of a repulsion type moving iron instrument. (7M)

    b) Explain the function of deflecting torque, control torque, and damping torque in a moving coil instrument. (7M)

5. a) List out various non renewable energy resources and discuss its applications. (7M)

    b) Explain the working of two-stroke Otto engine with P-V diagram. (7M)

6. a) What is a gray body? Derive the expression for radiation heat exchange between two gray surfaces connected by single refractory surface. (7M)

b) A 60mm thick plate with a circular hole of 30mm diameter along the thickness is maintained at uniform temperature of 277^0C. Find the loss of energy to the surroundings at 20^0C, assuming that the two ends of the hole to be as parallel discs and the metallic surfaces and surroundings have black body characteristics. (7M)

7. a) Explain the functioning of lathe and Write down its specification. (7M)

b) Explain how Brazing is different from welding. Why is Brazing more extensively used in industrial practice? (7M)