Code No: **R161214**

( **R16** )

( **SET - 1** )

**I B. Tech II Semester Supplementary Examinations, January/February - 2023**
**ELECTRICAL AND MECHANICAL TECHNOLOGY**
(Common 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  (14 Marks)

1.  a)  What is the back e.m.f. or counter voltage in a DC Motor.                            [2M]
    b)  Explain the term voltage regulation.                                                 [2M]
    c)  The sensitivity of a moving-coil metre movement is 1000 Ω/V. What is the value        [3M]
        of full-scale deflection current?
    d)  Enumerate the various forms of energy with minimum two examples each.                 [3M]
    e)  What is the conduction mode of heat transfer?                                         [2M]
    f)  Distinguish between brazing and soldering.                                            [2M]

## PART –B (56 Marks)

2.  a)  Discuss in detail the losses in a transformer and on what factors do they depend?     [7M]
    b)  Calculate the e.m.f. generated by a four-pole wave wound armature, having 45          [7M]
        slots with 18 conductors per slot when driven at 1200 r.p.m. The flux per pole is
        0.016 Wb.

3.  a)  Explain the constructional aspects and principle of working of an Alternator.         [7M]
    b)  A four-pole induction motor operating at a frequency of 50 Hz has a full-load rotor   [7M]
        slip of 5 percent. Calculate the rotor frequency: (i) At the instant starting; and (ii)
        At full load.

4.  a)  Explain the following w.r.t indicating instruments:                                   [7M]
        i) Deflection torque ii) Controlling torque iii) Damping torque

    b)  Explain the working of Induction type energy meter with a neat diagram.               [7M]

5.  a)  List the merits and demerits of Renewable and non renewable energy resources.         [7M]
    b)  With neat sketch explain the working of a four stroke petrol engine.                   [7M]

6.  a)  Aluminum fins 1.5cm wide and 1.0mm thick are placed on a 2.5cm diameter tube          [7M]
        to dissipate the heat. The tube surface temperature is $170^0$C, and the ambient-fluid
        temperature is $25^0$C. Calculate the heat loss per pin for h=130 w/m$^2$.$^o$C Assume
        k=200W/m.$^o$C for aluminum and fin efficiency=0.82

    b)  Explain what do you mean by absorptivity, reflectivity and transmissivity.            [7M]

7.  a)  Discuss the main characteristics and principle of forging processes?                  [7M]
    b)  An electric motor supplies 10 kW power by an open belt drive. The diameter of         [7M]
        the motor pulley is 300 mm and it rotates at 800 rpm. Calculate the tension on two
        sides of the belt if their ratio is 1.5.

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1 of 1