B.Tech III Year I Semester (R20) Supplementary Examinations August 2023
MEASUREMENTS & SENSORS
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
  (a) Define precision.   2M
  (b) Explain resolution.   2M
  (c) Write expression for deflecting torque.   2M
  (d) Explain driving torque.   2M
  (e) Discuss working of current transformer.   2M
  (f) Explain standardization.   2M
  (g) Draw circuit for Adersons's bridge.   2M
  (h) Explain how to measure loss angle.   2M
  (i) Discuss working of pressure sensor.   2M
  (j) Explain working of motion sensor.   2M

PART – B
(Answer all the questions: 05 X 10 = 50 Marks)

2   Discuss working of PMMC and dynamometer instruments.   10M
                                   OR
3   Explain successive approximation method.   10M

4   Explain working of dynamometer type PF meter.   10M
                                   OR
5   Discuss working of a three phase energy meter.   10M

6   Explain working of AC potentiometer.   10M
                                   OR
7   Elucidate iron loss of bar sample.   10M

8   Explain sensitivity of Wheatstone's bridge.   10M
                                   OR
9   Discuss measurement of low resistance using Kelvin's double bridge. 10M

10   Discuss working of Cathode Ray Tube.   10M
                                   OR
11   Explain functionalities horizontal and vertical amplifiers.   10M

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B.Tech III Year I Semester (R20) Regular & Supplementary Examinations January 2024
MEASUREMENTS & SENSORS
(Electrical & Electronics Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
*****

1   Answer the following: (10 X 02 = 20 Marks)
   (a)   What is transfer instrument?   2M
   (b)   What are the essential parts of the ramp type DVM?   2M
   (c)   What is the major cause of creeping error in an energy meter?   2M
   (d)   A 3φ 500 V motor load has a power factor of 0.4. Two watt meters connected to measure the   2M
         input. They show the input to be 30 kW. Find the reading of each instrument.
   (e)   State the advantages of instrument transformers.   2M
   (f)   Differentiate the principle of dc potentiometer and ac potentiometer.   2M
   (g)   Why Maxwell Bridge is limited to the measurement of medium – Q coils?   2M
   (h)   What are the methods of measurements of medium resistance?   2M
   (i)   List out the applications of CRO's.   2M
   (j)   What is meant by recurrent sweep in cathode ray tube?   2M

PART – B
(Answer all the questions: 05 X 10 = 50 Marks)

2   How is the current range of PMMC instrument extended with the help of shunt & voltmeter   10M
        range extended with the help of multiplier?
                                         OR
3   Explain the working of Digital Frequency meter in detail.   10M

4   (a) With a neat sketch explain the construction and working of electrodynamometer type single 6M
        phase power factor meter.
    (b) Two wattmeters are connected to measure the power consumed by a 3-phase load with   4M
        power factor 0.4. Total power consumed by the load, as indicated by the two wattmeters is 30
        kW. Find the individual wattmeter readings.
                                         OR
5   Derive an expression for the driving torque in a single phase induction type meter. Show that 10M
        the driving torque is maximum when the phase angle between the two fluxes is 900 and the
        rotating disc is purely non-inductive.

6   A current transformer with bar primary has 300 turns in its secondary winding. The resistance 10M
        and reactance of the secondary circuit are 1.5 Ω and 1.0 Ω respectively, including the
        transformer winding. With 5A flowing in the secondary winding, the magnetizing mmf is 100AT
        and the core loss is 1.2 W. Determine the ratio and phase angle errors.
                                         OR
7   Describe the method of determination of BH curve of magnetic material using Method of   10M
        Reversals.

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8 (a) Write briefly on measurement of high resistance by loss of charge method. List the precautions in this method. 7M

   (b) What are the difficulties in measurement of high resistance? 3M

OR

9 Sketch the circuit diagram of Anderson's bridge. Derive the equations for resistive and inductive components of the inductor to be measured. 10M

10 (a) The deflection sensitivity of an oscilloscope is 35 V/cm. If the distance from the deflection plates to the CRT screen is 16 cm, the length of the deflection plates is 2.5 cm and the distance between the deflection plates is 1.2 cm, what is the acceleration anode voltage? 6M

    (b) Write a short note on vertical amplifier. 4M

OR

11 Explain the working principle of a Linear Variable Differential Transformer (LVDT). Show how it can be used for measuring small mechanical displacements. 10M

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