**B. TECH**
**(SEM-III) THEORY EXAMINATION 2019-20**
**ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS**

*Time: 3 Hours*                                                    *Total Marks: 100*

**Note:** Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

**1.      Attempt *all* questions in brief.                              2 x 10 = 20**

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|---|---|
| a. | Explain following term- Gross Error, Random Error. |
| b. | What are the differences between moving coil and moving iron instruments? |
| c. | How do instrument transformers differ from power transformer? |
| d. | How is an ac tachometer superior to dc tachometer? |
| e. | Name the difficulty associated with the measurement of high resistances. |
| f. | What are the factors which affect the measurement accuracy of Q-meter? |
| g. | Distinguish between dc and ac type potentiometers. |
| h. | What is ballistic galvanometer? Give the expression for the deflection of ballistic galvanometer in terms of its physical constants. |
| i. | What are the advantages of integrating type A/D converters over the non integrating type? |
| j. | What is meant by Harmonic distortion? What do you understand by total harmonic distortion? |

**SECTION B**

**2.      Attempt any *three* of the following:                              10x3=30**

| | |
|---|---|
| a. | Compare a moving coil type of velocity transducer with a moving magnet type of velocity transducer on the following points:<br>    i.    Construction<br>    ii.   Operation and<br>    iii.  Relative merits and demerits. |
| b. | Describe the method of measuring inductance using Maxwell's inductance bridge on following points:<br>    i.    Circuit Diagram<br>    ii.   Phasor diagram<br>    iii.  Derivation of formula |
| c. | Describe construction and working of electrodynamometer type voltmeter. |
| d. | Explain A.C. wattmeter method for determination of iron loss of test specimen of iron piece. |
| e. | How many types of digital Voltmeters are there? Explain the integrating type of digital voltmeter. What are its specific advantages |

**SECTION C**

**3.      Attempt any *one* part of the following:                              10x1=10**

| | |
|---|---|
| a. | i. Explain the various operating torques in an energy meter.<br>ii. Explain the causes and remedies of the errors occurring in a wattmeter |
| b. | Explain the term "Standard" in measurement system. Also mention the various types of standard used in industry. |

**4.**     **Attempt any *one* part of the following:**                    **10x1=10**

| a. | Draw an equivalent circuit and phasor diagram of potential transformer (PT).Derive the expression for its ratio and phase angle errors. |
| --- | --- |
| b. | Explain the working of a electrical resonance type frequency meter. Draw the phasor diagram under different power factor conditions. |

**5.**     **Attempt any *one* part of the following:**                    **10x1=10**

| a. | The four arms of a bridge network are made up as follows. Arm AB – a resistor of 40 ohm in parallel with an inductor of 0.1 H. Arm BC – a resistor of 120 ohm Arm CD - a unknown resistor R in parallel with unknown capacitor C. Arm DA – a resistor of 1000 ohm. A 50 hz voltage supply is applied across A and C. Find R and C when vibration galvanometer connected across B and D is undeflected. |
| --- | --- |
| b. | What precautions are taken while measuring low resistance? Explain the reason how a Kelvin's double bridge measures low resistances without error. |

**6.**     **Attempt any *one* part of the following:**                    **10x1=10**

| a. | How unknown e.m.f is measured using Drysdale-Tinsley AC potentiometer. |
| --- | --- |
| b. | Draw BH Curve, how B-H curve is determined using method of reversals? |

**7.**     **Attempt any *one* part of the following:**                    **10x1=10**

| a. | Draw and explain the circuit of different types of digital frequency meter. |
| --- | --- |
| b. | A voltmeter uses 4 ½ digit display.<br>    i.   Find its resolution.<br>    ii.  How would the 11.87 V be displayed on a 10 V range?<br>    iii. How would the 0.5573 be displayed on 1 V and 10 V ranges |