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Subject Code:NEE302/EEE302/ EE304

Roll No: | | | | | | | | | | |

B TECH
(SEM–III) THEORY EXAMINATION, 2018-19
ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS

Time: 3 Hours *Max. Marks: 100*

Note: Be precise in your answer. In case of numerical problem assume data wherever not provided

SECTION – A

1. Attempt all parts of the following. **(10*2=20)**

(a) Distinguish between direct and indirect measurement.
(b) What do you mean by sensitivity and accuracy for dynamic measurement?
(c) Differentiate between current transformer & potential transformer.
(d) Explain different way of classification of electrical transducers.
(e) What are the difficulties in measurement of high resistance?
(f) Explain the term standardization of a potentiometer.
(g) Why Kelvin's bridge is preferred for low resistance measurement?
(h) What are the advantages of digital indicating instruments over analog instruments?
(i) What do you mean by lissajous pattern?
(j) What is the principle of working of flux meter?

SECTION – B

2. Attempt any three parts of the following: **(3*10=30)**

(a) Explain moving iron power factor meter its advantage and disadvantages.
(b) Draw and explain the equivalent circuit and phasor diagram of a current transformer. Derive the relation for ratio and phase angle errors.
(c) Explain different method of capacitive measurement in detail.
(d) Derive the balance equation for modified De Sauty Bridge. Also explain its advantage over simple De Sauty Bridge. Also draw its phasor diagram.
(e) Describe the construction and working of a polar type potentiometer. What are the functions of the transfer instrument and phase shifting transformer.

SECTION - C

3. Attempt any one parts of the following: **10 x 1 = 10**

(a) What are the basic blocks of generalized instrumentation system? Draw the various blocks and explain their functions.
(b) Explain the construction and working of Ratio meter type frequency meter.

4. Attempt any one parts of the following: 10 x 1 = 10

(a) Explain the working of Spectrum analyzer with the help of suitable block diagram.
(b) A flow meter is calibrated from 0 to 100 m3/s. The accuracy is specified as within ±0.75% above 20% of scale reading. What is static error if the instrument indicates 80 m3/s?

5. Attempt any one parts of the following: **10 x 1 = 10**

(a) The four arms of a Wheatstone bridge are as follows: AB=100Ω, BC= 1000 Ω, CD= 4000 Ω and DA= 400 Ω. The galvanometer has a resistance of 100 Ω, a sensitivity of 100mm/μA and is connected across AC . A source of 4 V d.c. is connected across BD. Calculate the current through the galvanometer and its deflection if the resistance of arm DA is changed from 400 Ω to 401 Ω.

(b) Explain Kelvin's double bridge method for the measurement of low resistance.

6. Attempt any one parts of the following: **10 x 1 = 10**

(a) The power is measured by with an A.C. potentiometer. The voltage across a 0.1Ω standard resistance connected in series with load is 0.35 - j0.10 V. The voltage across 300:1 potential divider connected to the supply is 0.8 + j0.15V.

(b) Determine the power consumed by the load and power factor. Give the construction and working of a flux meter.

7. Attempt any one parts of the following: **10 x 1 = 10**

(a) A cable is tested by loss of charge method using a ballistic galvanometer, with following results:
Discharged immediately after electrification, deflection 200 division. Discharge after 30 Sec. and after electrification (i) deflection 126 divisions (ii) when in parallel with a resist. of 10MΩ, deflection 100 division. Calculate the insulation resistance of the cable.

(b) Describe the construction and working of Analog Storage CRO using block diagram.