BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO/2022)

CLASS: BTech
BRANCH: EEE

SEMESTER : III
SESSION : MO/2022

SUBJECT: EE201 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

TIME: 03 Hours

FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

---

Q.1(a) Define the term scale span and give example. [2]
Define the term sensitivity drift and draw the graph. CO 1, BL 2

Q.1(b) Three resistors have the following ratings: R_1 = 200 Ω ± 5%, R_2 = 100 Ω ± 5% and R_3 = 50 Ω ± 5%. [3]
Determine the limiting error in percentage and in ohm if the above resistances are connected in parallel. CO 1, BL 5

Q.1(c) Define primary and secondary standards. [5]
A batch of colour coded resistors of value 5.6 kΩ were measured and were found to have the following values: 5.75, 5.60, 5.65, 5.50, 5.70, 5.55, 5.80, 5.55 kΩ. Determine the mean and standard deviation. CO 1, BL 5

Q.2(a) The coil of a measuring instrument has a resistance of 1 Ω and the instrument has a full scale deflection of 250 V when a resistance of 4999 Ω is connected in series with it. Find (a) the current range of the instrument when used as an ammeter with the coil connected across a shunt of 1/499 Ω and (b) the value of the shunt resistance for the instrument to give a full scale deflection of 50 A. [2]
CO 2, BL 3

Q.2(b) Describe the construction and working of PMMC instrument. Derive the equation for deflection if the instrument is spring controlled. [3]
CO 2, BL 3

Q.2(c) Describe the constructional details and working of a single phase electrodynamometer type of power factor meter for measurement of power factor. [5]
CO 2, BL 4

Q.3(a) Draw the circuit diagram of a basic slide wire potentiometer and state in short the procedure for standardization of the potentiometer. [2]
CO 3, BL 3

Q.3(b) Describe the Murray Loop test for localization of short circuit faults in cables. CO 3, BL 3 [3]

Q.3(c) Describe the working of a low voltage Schering bridge. Derive the equation for capacitance. Draw the phasor diagram of the bridge under conditions of balance. [5]
CO 3, BL 4

Q.4(a) Compare between analog and digital instruments. (2 points) CO 4, BL 2 [2]

Q.4(b) What is the function of a time base generator in a CRO. Explain with a circuit how a time base is generated in a CRO. [3]
CO 4, BL 3

Q.4(c) What is an XY recorder. Explain with a suitable diagram, the working of an XY recorder. Write any two of its applications. [5]
CO 4, BL 3

Q.5(a) Distinguish between a primary and a secondary transducer with an example. CO 5, BL 2 [2]

Q.5(b) Explain how a capacitive transducer can be used for measurement of linear and rotational displacement (one method each). [3]
CO 5, BL 3

Q.5(c) Describe the construction, theory and working of thermocouples. CO 5, BL 3 [5]

:::::22/11/2022:::::E