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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION - JULY 2024

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| **Semester : 5** | **Date :9/07/2024** |
| **Course Code :EEE2012** | **Time :9:30 am to 12:30 am** |
| **Course Name : Electrical & Electronic measurements and instrumentation** | **Max Marks :100** |
| **Program : B.Tech & 5th Sem** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 2M=10M** | | | |
| 1 | Compare and contrast the fundamental differences between a Cathode Ray Oscilloscope (CRO) and a Digital Storage Oscilloscope (DSO) in terms of their display technology, advantages, and limitations | (CO1) | [Knowledge] |
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| 2 | Differentiate between a Digital Voltmeter (DVM) and a Digital Multimeter (DMM) by discussing their primary functions and capabilities | (CO1) | [Knowledge] |
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| 3 | Briefly explain the criteria used for the classification of transducers. | (CO1) | [Knowledge] |
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| 4 | What are the functional elements of an instrument, and how do they contribute to its accuracy in measurements? | (CO1) | [Knowledge] |
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| 5 | What are the common errors encountered in measurements, and how can they be minimized or corrected? | (CO2) | [Knowledge] |
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| 6 | Explain the working principle of a galvanometer. How is it converted into a DC ammeter and a DC voltmeter? | (CO2) | [Knowledge] |
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| 7 | Explain the concept of Multi-Range Ammeter and Voltmeter. How are these instruments designed to measure a wide range of currents and voltages? | (CO2) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 8 | A periodic voltage waveform observed on an oscilloscope across a load by an engineer as shown in figure below . A permanent magnet moving coil ( PMMC) voltmeter has been connected across the same load. Estimate the reading of the voltmeter in volts by stating the reason for such reading.  IMG_256  . | (CO2) | [Understand] |
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| 9 | IMG_256 By referring to the above figure explain after writing the count sequence when the switch position is in position B. Also explain the mechanism if 1/2 digit is turned on. | (CO2) | [Understand] |
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| 10 | Measurement of high voltages has always been an arduous task and hence some special types of equipments are used for that purpose. High voltages must be stepped down to a safer level before feeding the measuring meters and protective relays as these are low voltage devices and will get damaged. An equipment was installed in a substation for measurement of high voltages and for overvoltage protection. In that context discuss about the different parts of those types of equipments. | (CO3) | [Understand] |
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| 11 | Some engineers got a contract of building an automatic monorail system, as their project in Bologne Italy, which would be powered mainly by the solar panels and additional power requirement will be met by some other sources of energy. The system is designed to operate using solar energy captured by photovoltaic panels placed at each monorail station and along the track’s south facing side. It was suggested by some experts that a special type of a material which generates electrical power when compressed could be used as a source for meeting the additional power requirements by placing it on the track of the monorail system. Suggest and discuss about the material which could be used to fulfill the additional power requirements | (CO2) | [Understand] |
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| 12 | Identify and Explain with neat Block Diagram the function and operation of a measuring Instrument with advanced trigger, storage, display and measurement features that can store and analyses the signal digitally. | (CO3) | [Understand] |
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| 13 | In an electromechanical instrument, a magnetic material was wound with number of turns of the coil. It is a familiar theory that  there are magnetic dipoles, which are in random motion inside the material and the net magnetic moment is zero. When an Alternating current is supplied through the coil the dipoles get aligned in a particular direction in the direction of the magnetic field. Referring to the above statements, explain the concept of reversal of magnetic dipoles after identifying the phenomenon with the help of diagrams. | (CO2) | [Understand] |
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| 14 | In a survey of 15 owners of a certain model of car, the following figures for average petrol consumption were reported. 25.5, 30.3, 31.1, 29.6, 32.4, 39.4, 28.9, 30.0, 33.3, 31.4, 29.5, 30.5, 31.7, 33.0, 29.2 a) Identify the unknown parameters that could be computed from the given data b) Compute the unknown parameters | (CO3) | [Understand] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** | | | |
| 14 | A barium titanate piezoelectric material has dimensions of 5 mm\*5mm\*1.25mm. The force acting on it is 5 N. The charge sensitivity of barium titanate is 150 pC/N and its permittivity is 12.5\*10^-9 F/m Young's modulus of barium titanate is 12\*10^6 N/m^2.  i) Identify the unknown parameters that could be computed from the given data ii) Compute the unknown paramters | (CO4) | [Understand] |
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| 15 | The output of an LVDT is connected to a 5 V voltmeter through an amplifier of amplication factor 250. An output of 2 mV appears across the terminals of LVDT when the core moves through a distance of 0.5 mm. the voltmeter has 100 divisions. The scale can be read to 1/5th of a division.  i) Identify the unknown parameters that could be computed from the given data ii) Compute the unknown parameters | (CO3) | [Understand] |
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| 16 | The line to line input voltage to a 3 phase 50 Hz star connected balanced AC circuit shown in figure below is 100 V and two watt meters are connected at the input which are indicated by the circled portion in the figure given below, What would be the wattmeter readings if the phase sequence is RYB?   IMG_256 | (CO2) | [Understand] |