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Set No. 1

III B.Tech I Semester Supplementary Examinations, June - 2015 ELECTRICAL MEASUREMENTS

(Electrical and Electronics Engineering)

Time: 3 hours

Code No: R31022

Max. Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

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8		Write short notes on the following:a) Successive Approximation type Digital voltmeter b) Standardization procedurec) Three phase Energy meter.	[15]		
7		Explain how magnetizing and loss components of no load current of a transformer be determined by using an A.C. Potentiometer.	[15]		
6	a) b)	Explain how capacitance can be measured by the use of Schering bridge with a neat diagram and draw the vector diagram under balanced conditions. A balanced 5 KHz bridge has the following configuration: Arm AB : R ₁ = 4000 Ω in parallel with C ₁ = 0.063 μ F BC : R ₂ = 2500 Ω in series with C ₂ = 0.63 μ F CD : the unknown R and C DA : Pure capacitance C ₄ = 0.305 μ F Calculate the unknown R and C. Draw the phasor diagram of the above bridge under balanced condition.	[10] [5]		
5	a) b)	Explain in detail the use of Guard circuit for high resistance measurement. In a Kelvin double bridge, there is error due to mismatch between the ratios of outer and inner arm resistances. The data of the bridge is as given below:- Standard resistance = 99.03 $\mu\Omega$; inner ratio arms = 99.31 Ω and 200 Ω ; outer ratio arms = 99.24 $\mu\Omega$ and 200 Ω ; The resistance of connecting leads from standard to unknown resistor is 650 $\mu\Omega$. Calculate the unknown resistance.	[7] [8]		
4	a) b)	Explain how calibration of Voltmeter and Wattmeter can be done using a DC Potentiometer. List the basic requirements of AC potentiometers.	[8] [7]		
3	a) b)	Explain with a neat diagram how power measurement can be done using CT and PT (Instrument transformers). Explain the construction and working of a Merz price maximum demand indicator	[8] [7]		
2	a) b)	Derive the Phase angle of a Potential transformer from its equivalent circuit and Phasor diagram. Explain the working of a single phase electrodynamometer type Power factor meter with a neat diagram.	[8] [7]		
1	a) b)	Derive the Torque equation for Moving iron Instruments. Explain the various methods of providing damping torque in an indicating instrument.	[8] [7]		

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Set No. 2

Max. Marks: 75

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Answer any FIVE Questions

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- 1 a) Derive the equation for deflection in spring controlled permanent magnet Moving coil [8] instrument. b) What is a loading effect? Explain how to overcome it. [7] 2 a) Derive the actual ratio of a Current transformer from its equivalent circuit and Phasor [8] diagram. b) Why secondary of current transformer should never be open when the Primary winding [7] is energized. 3 a) List the different types of errors that propel up in Dynamometer Wattmeter and the [7] methods to compensate them. b) Explain with a neat diagram the working of a single phase induction type energy meter. [8] 4 a) Explain the operation of DC Crompton Potentiometer with a neat diagram. [8] b) Design a volt ratio box with a resistance of 50Ω /volts and ranges 25 V, 50 V, 75 V, 150 [7] V, and 300 V. The volt ratio box is to be used with a potentiometer having a measuring range of 1.6 V. 5 a) Explain how insulation resistance of a cable can be measured with the help of loss of [8] charge method. b) State the advantages of using the bridge circuits for the measurement. [7] 6 a) List the advantages and disadvantages of Desauty's Bridge. [7] b) A sample of Bakelite was tested by the Schering bridge method at 33 KV, 50 Hz. [8] Balance was obtained with a standard condenser of 116 PF capacitance, a condenser of capacitance 0.8 μ F in parallel with a non reactive resistor of 419 Ω and a non reactive resistor of 220Ω . Determine the equivalent series resistance and the power factor of the specimen. 7 a) Explain the 'Lloyd Fisher square' method of measuring iron losses in a magnetic [7] material. b) Explain the method for finding out the B-H curve of a magnetic materials using step by – [8] step method. Write short notes on the following: 8 [15] a) Phantom Loading in Energy meters b) Quality factor in AC Bridges.
 - c) Power factor meters.

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Set No. 3

III B.Tech I Semester Supplementary Examinations, June - 2015 ELECTRICAL MEASUREMENT

(Electrical and Electronics Engineering)

Time: 3 hours

Code No: R31022

Max. Marks: 75

Answer any FIVE Questions All Questions carry equal marks

1	a) b)	Explain the construction and working of Repulsion type Moving iron Instruments. List the different types of errors in PMMC Instruments and how they can be overcome.	[8] [7]
2	a) b)	Compare between Current transformer and Potential transformer. List the various parameters that affect the characteristics of current transformer.	[8] [7]
3	a) b)	Derive the necessary torque equation for the Electrodynamometer type Instruments. In a Power measurement test the two wattmeter readings are 4 KW and 1 KW. Calculate the power and power factor if i) both meters read direct ii) One meter connection is reversed.	[8] [7]
4	a)	Explain the standardization procedure of a potentiometer.	[7]
	b)	Explain the Operation of Gall – Tinsley Co – ordinate type A.C. Potentiometer with a neat diagram.	[8]
5	a)	List the difficulties encountered in the measurement of high resistances? How to overcome these limitations?	[7]
	b)	Explain the working of Carey – Foster slide wire bridge with neat circuit diagram.	[8]
6	a)	Explain the different types of detectors used in ac bridges.	[7]
	b)	Explain, with a neat diagram, how the inductance can be measured by using Hay bridge.	[8]
7	a)	Explain the determination of Hysteresis loop by method of reversals using a neat diagram.	[8]
	b)	List the advantages and disadvantages of ring and bar specimens used in testing of magnetic materials.	[7]
8		Write short notes on the following: a) Loading effect in Instruments b) Creeping in energy meter c) Digital Tachometer.	[15]



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Set No. 4

III B.Tech I Semester Supplementary Examinations, June - 2015 ELECTRICAL MEASUREMENT

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75 **Answer any FIVE Questions** All Questions carry equal marks ***** 1 a) Explain the construction and working of a Permanent magnet moving coil meter. [8] b) Explain the working of Universal shunt used for multi range ammeters. [7] 2 a) Explain the following terms with respect to Instrument transformers:-[8] i) Actual Ratio ii) Nominal ratio iv) Burden of an instrument transformer iii) Ratio correction factor b) A current transformer has a single turn primary and 400 secondary turns. The magnetizing [7] current is 90A while core loss current is 40A. Secondary current phase angle is 28° . Calculate the actual primary current and ratio error when secondary carries 5A current. 3 a) List the advantages and disadvantages of Electrodynamometer type Instruments. [7] b) Explain the working of Low power factor Electrodynamometer type wattmeter with a neat [8] diagram. 4 a) Explain the working of a basic slide wire DC potentiometer with a neat diagram. [7] b) How the unknown emf is measured using Drysdale – Tinsley A.C. Potentiometer? [8] 5 a) Why the voltmeter – ammeter method is unsuitable for the precise measurement of low [7] resistance. b) Calculate the insulation resistance of a cable which was tested for insulation resistance by [8] loss of charge method. An electrostatic voltmeter of infinite resistance is connected between the cable and earth forming a joint capacitance of 0.0007 $\mu\Omega$. It is observed that the charging voltage falls from 290 Volts to 95 Volts in one minute. 6 a) Explain how the inductance can be measured by using Maxwell bridge with a neat [8] diagram. b) Explain how Wein bridge can be used for the measurement of frequency with a neat [7] diagram and derive the necessary equation under the balanced condition. 7 a) Classify the different types of magnetic materials with an example of each type. [7] b) Explain from basics the working of a Ballistic Galvanometer with a neat diagram. [8] 8 a) Explain the working of Dual slope integrating type digital voltmeter with a neat diagram. [8] b) List the specifications of Digital Voltmeters. [7]

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