College of Engineering, Pune

Second Year B. Tech. – Instrumentation & Control

IE203 – Basic Instrumentation

Timing: 3 hrs
Max. Marks: 50

Academic Year: 2011- 12

End Semester

Instructions:
1. All Questions are compulsory.
2. Assume suitable data
3. Draw neat diagrams wherever necessary
4. Use of non programmable calculators are allowed

			Marks
Q. 1	A.	Explain the dynamic behavior of PMMC system. What are different Damping mechanisms used for the system? How temperature compensation can be achieved in PMMC system.	5
Q. 1	B.	In the strip chart and XY recorders, what are different assemblies or system used? Explain them in details. What is power factor correction? Where it is required?	5
Q. 2	A.	What is electrodynamometer type ammeter? How the same instrument can be used for power measurement. A dc ammeter is constructed of a 133.3 ohm resistance in parallel with a PMMC system. If the instrument has a 1.2 Kohms coil resistance and 30uA FSD, determine the measured current at FSD, 0.5 of FSD, and 0.33 of FSD.	5
Q. 2	B.	Define & explain the terms: Active power, apparent power and reactive power.	3
Q. 2	C.	Suggest a bridge circuitry that can be used for frequency measurement upto 10 KHz. Explain its working principle.	2
Q. 3	A.	Explain two methods of phase power measurement system in details	2
	B.	Suggest an instrument that can be used for measuring energy of signal with frequencies around 60 Hz. Explain the working and construction of the instrument in details.	3
Q. 3	C.	How a PMMC system can be converted into current meter and voltmeter? Explain the extension of ranges for voltmeter A PMMC instrument with Rm = 1.3Kohm and FSD = 500uA is used in a multirange dc voltmeter. The series connected multiplier resistance values are R1= 38.7 Kohm, R2= 40 Kohm and R3 = 40 Kohm. Calculate the three ranges and determine the voltmeter sensitivity.	5
Q. 4	A.	Suggest, justify and explain the type of recorder that can be used for below applications. 1. Characteristic of n-p-n transistor in common base configuration is to be	5

		plotted. 2. A flow meter used for measurement of flow with Reynolds no. 3500. The continuous reading of the flow meter is to be recorded.	
Q. 4	B	A Wheatstone bridge has resistance P & S and Q&R are in the opposite arm. P= 3.5 Kohm, Q = 7 Kohm, S= 4Kohm, R = 2 Kohm. Voltage supplied to them is 10 V and galvanometer has sensitivity of 1uA/mm and internal resistance of 2.5 Kohm. Calculate the minimum change in R which can be detectable by the bridge.	5
Q. 5	A	Write short notes on 1. AC Bridges 2. Rectifier type AC ammeter	5
Q.5	B	Derive expression for power across when AC sinusoidal voltage is applied across - 1. Pure resistor 2. Pure Capacitor 3. Pure Inductance Also draw correct waveform.	5

----------BEST OF LUCK ----------