Total No. of Questions : 8]

SEAT No. :

P5019

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[4960]-1072

M.E. (Mech. - Design Engg.)

MECHANICAL MEASUREMENT & CONTROL

(2013 Course) (Semester - III)

Time : 2 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any 5 questions.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Figures to right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) What are the stages of measurement system. **[5]**

b) Explain probable error & standard error. **[5]**

Q2) a) Explain different types of correlation. **[5]**

b) Find the most likely production corresponding to rain fall 40" from the following data. **[5]**

	$\frac{\text{Rainfall}}{30''}$	$\frac{\text{production}}{500\,\text{kg}}$
Average		
Standard Deviation	5"	100kg

Co-efficient of correlation = 0.8

Q3) a) What are properties of correlation co-efficient. **[4]**

b) Obtain the lines of regression from the data given **[6]**

X:	4	5	6	8	11
Y:	12	10	8	7	5

Verify that co-efficient of correlation is geometric mean of two co-efficients of regression.

P.T.O.

Q4) a) Explain the working of ultrasonic flow meter stating its applications. **[5]**

b) A copper resistor at 20°C is used to measure the temperature of bearing of a machine. What is the value of maximum resistance if the maximum bearing temp. is not to exceed 150°C. The resistance temperature co-efficient is 0.00393/°C at 20°C. **[5]**

Q5) a) What are the various methods to measure level. Explain capacitance method. **[5]**

b) How do you measure phase angle. **[5]**

Q6) a) What are the transient response specifications. **[5]**

b) Explain P +Σ + D. Control system. **[5]**

Q7) a) Draw Bode's plot for a control system whose transfer function is

$$G(S)H(S)=\frac{80}{S(1+0.025)(1+0.05S)}$$ **[5]**

b) Discuss the resistance temperature properties of a thermister. **[5]**

Q8) a) Find the stability of a feedback control system $S^5+S^4+4S^3+2S+1=0$.**[5]**

b) Explain the calibration of a thermocouple. **[5]**

y2 y2 y