

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

TEXTILE TECHNOLOGY

EEE252: Instrumentation and Control Systems

Time: Three Hours

Maximum Marks: 100

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. A device which converts a physical quantity into an electrical quantity is known as
 - a) System
 - b) Control System
 - c) Feedback device
 - d) Transducer
2. Permanent Magnet Moving Coil is used for
 - a) Alternating Current
 - b) Direct Current
 - c) Both AC and DC
 - d) None of the above
3. Differential bubbling is used to measure
 - a) density
 - b) speed
 - c) flow
 - d) pressure
4. _____ can be defined as the internal friction of a fluid.
 - a) Viscosity
 - b) Humidity
 - c) Moisture
 - d) Density
5. _____ is defined as that force which tends to produce rotation.
 - a) Speed
 - b) flow
 - c) torque
 - d) velocity
6. _____ is a ratio of changing length to original length.
 - a) Strain
 - b) Stress
 - c) force
 - d) torque
7. Transfer function of a system is defined as the ratio of output to input in
 - a) Simple algebraic form
 - b) Z-transform
 - c) Fourier transform
 - d) Laplace transform
8. _____ controller is not used in control systems.
 - a) Proportional
 - b) Integral
 - c) Proportional + Integral
 - d) Derivative

9. The type-0 system has
- | | |
|---------------------------|----------------------------|
| a) net pole at the origin | b) no pole at the origin |
| c) simple at one origin | d) two poles at the origin |
10. _____ is defined as the ratio of actual damping to critical damping.
- | | |
|----------------------|----------------------|
| a) Damping frequency | b) Cut-off Frequency |
| c) Damping Ratio | d) Bandwidth |

PART B (10 x 2 = 20 Marks)

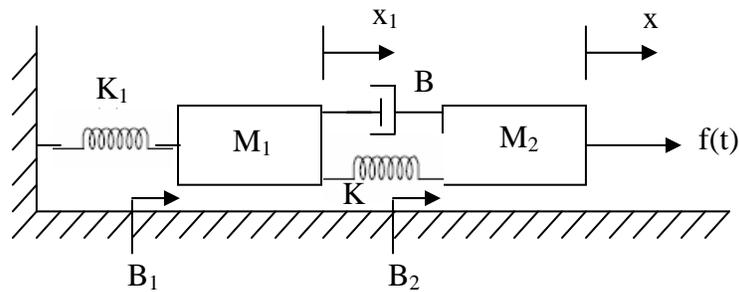
11. List the elements of generalized measurement system.
12. List the types of recording instruments.
13. What are the major three methods of flow meters?
14. Define Humidity.
15. List the different types of torque measurement.
16. List the types of strain gauges.
17. Distinguish between open loop and closed loop system.
18. Write Masons Gain formula.
19. List the time domain specifications.
20. What is the necessary and sufficient condition for stability?

PART C (5 x 14 = 70 Marks)

21. a) (i) With the neat sketch, explain the construction and working principle of PMMC instruments. (7)
- (ii) Explain X-Y recorders with neat sketch. (7)
- (OR)**
- b) (i) Explain LVDT with neat sketch. (7)
- (ii) Explain the types of errors and how to eliminate it. (7)
22. a) (i) Explain C-type bourdon tube with neat sketch. (7)
- (ii) With the neat sketch, explain Orifice plate. (7)
- (OR)**
- b) (i) Explain bridge type gas densitometer with neat sketch. (7)
- (ii) Explain float type level measurement with neat sketch. (7)
23. a) Explain bonded and unbonded type strain gauge with neat sketch. (7+7)
- (OR)**

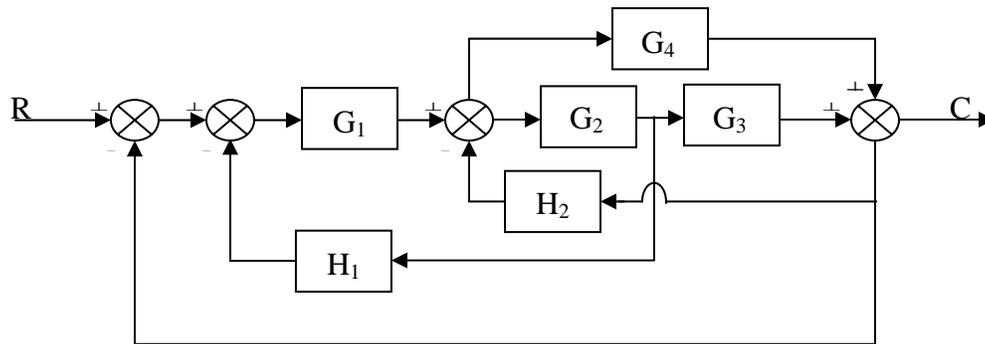
b) Explain Prony brake and proximity sensors type of torque measurements with neat sketch. (7+7)

24. a) Write the differential equations governing the mechanical system and determine the transfer function for the figure shown.



(OR)

b) Convert the block diagram to signal flow graph and determine the transfer function using mason's gain formula.



25. a) Draw the response of second order system for under damped case and when input is unit step.

(OR)

b) Check whether the system is stable or unstable and comment on the location of roots.

(7+7)

(i) $s^7 + 9s^6 + 24s^5 + 24s^4 + 24s^3 + 24s^2 + 23s + 15 = 0$

(ii) $s^5 + s^4 + 2s^3 + 2s^2 + 3s + 5 = 0$
