| Reg. No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Question Paper Code | 11828 |
|---|---|

## B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023
Seventh Semester
**Production Engineering**
**PR8003 - INSTRUMENTATION AND CONTROL**
(Regulations 2017)

Duration: 3 Hours                                                    Max. Marks: 100

### PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

|  |  | *Marks,*<br>*K-Level,CO* |
|---|---|---|
| 1. | What is the difference between allowance and tolerance? | *2,K1,CO1* |
| 2. | Mention any four precautions to be taken while using slip gauges. | *2,K1,CO1* |
| 3. | What are the real time applications of accelerometer? | *2,K1CO2* |
| 4. | Prioritize the Industrial applications of Measuring the vibrations. | *2,K2,CO2* |
| 5. | List the recording techniques employed by magnetic tape recorders. | *2,K1,CO3* |
| 6. | What are the advantages of Laser printer? | *2,K1,CO4* |
| 7. | What is feedback? What type of feedback is employed in control systems? | *2,K1,CO4* |
| 8. | Define control systems. | *2,K1,CO5* |
| 9. | What is the necessary condition for stability? | *2,K1,CO5* |
| 10. | What is limitedly stable system? | *2,K1,CO5* |

### PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

| 11. | a) | Derive the equations for time response of a first order system subjected to ramp input. | *13,K2,CO1* |
|---|---|---|---|
| | | **OR** | |
| | b) | Explain the dynamic performance characteristics of measuring instruments. | *13,K2,CO1* |
| 12. | a) | Explain in detail the working of various types of dynamometers used for force measurement. | *13,K2,CO2* |
| | | **OR** | |
| | b) | How optical pyrometer is providing an accurate temperature measurement? Justify with neat sketch and working principle. | *13,K2,CO2* |
| 13. | a) | Draw and explain Digital Storage Oscilloscope in detail. State their advantages. | *13,K2,CO3* |
| | | **OR** | |
| | b) | What do you mean by "data logger"? Give a detail explanation using an appropriate example. What uses do data loggers have? | *13,K1,CO3* |

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*          **11828**

14. a) Write the differential equations governing the mechanical rotational system shown in the figure and find transfer function.     *13,K3,CO4*
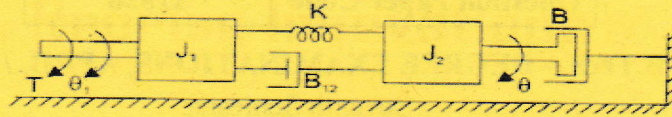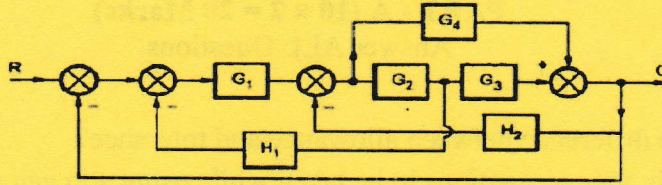


Fig 1.

**OR**

b) Using Block diagram reduction technique find the Transfer Function of the system.     *13,K3,CO4*



15. a) With the help of Routh's stability criterion find the stability of the following systems represented by the characteristic equations:     *13,K3,CO5*
(a) $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$.
(b) $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$.

**OR**

b) Explain the procedure for constructing root locus.     *13,K2,CO5*

## PART - C (1 × 15 = 15 Marks)

16. a) For the system represented in the given figure, determine transfer function C(S)/R(S).     *15,K3,CO4*
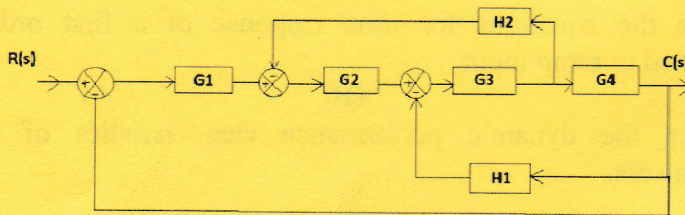


**OR**

b) Find the overall transfer function of the system whose signal flow graph is shown below.     *15,K3,CO5*



*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*     **11828**