

QUESTION BANK ON MECHATRONICS

(MECHANICAL ENGINEERING - 5TH SEM)



PREPARED BY

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GOVT. POLYTECHNIC NABARANGPUR

1 . List the factors for selection of sensors . (5 marks)

2. Explain with a block diagram the measurement system . (5 marks)
3. List different data presentation elements . (5 marks)
4. Explain briefly data acquisition system . (5 marks)
5. List the uses of bearing . (5 marks)
6. Explain briefly the electrical systems used as actuators . (5 marks)
7. List different control modes . (5 marks)
8. Explain electro - mechanical systems . (5 marks)
9. Classify memories . (5 marks)
10. Make use of sketch to explain the working of pneumatic sensors . (10 marks)
11. Make use of a sketch to explain briefly weighted-resistor DAC . (10 marks)
12. Make use of a sketch to explain the basic elements of a laser printer . (10 marks)
13. Make use of a sketch to explain the principle of the ratchet and pawl . (10 marks)
14. Make use of a sketch to explain relays . (10 marks)
15. Make use of a sketch to explain model of building up a thermal system . (10 marks)
16. Make use of a sketch to explain digital closed - loop control system . (10 marks)
17. Construct and explain a PLC ladder diagram for jumps .(10 marks)
18. How do you classify transducers ? describe the working of any type of transducer . also list out some industrial applications of transducers . (10 marks)
19. What are the advantages of non - destructive testing ? state some main NDT and their field of applications . (10 marks)
20. How does a microcontroller differ from a microprocessor .explain with respect to specific applications . (5 marks)
21. Describe the principle of working of pilot operated valve . (5 marks)
22. Explain what is meant by sequential control and illustrate your answer by an example .(5 marks)
23. Explain the difference between open loop and closed loop control system with the help of examples .(10 marks)

24. Identify the sensor ,signal conditioner , and display elements in the measurement systems of a mercury in glass thermometer . (5 marks)

25. The controller characteristics for on-off controller follow _____

- A) Only one curve
- B) Two curves
- C) Four curves
- D) Unpredictable

26. Define mechatronics . (2 marks)

27. What is meant by a system in mechatronics . (2 marks)

28. What are the main applications of mechatronics ? (2 marks)

29. What are the types of control systems ?(2 marks)

30. Obtain the basic functions of a control system .(2 marks)

31. List down the requirements of control system . (2 marks)

32. Give example of closed loop system and open loop system .(2 marks)

33. Mention the examples of automatic system .(2 marks)

34. Name elements of feedback system . (2 marks)

35. State the dynamic characteristics of simplified measuring system .(2 marks)

36. State the purpose of using potentiometer in displacement sensor ?(2 marks)

37. What do you mean by a displacement sensor ? give few examples of it . (2 marks)

38. What are the types of strain gauge ?(2 marks)

39. Mention the types of electrical strain gauge . (2 marks)

40. Name few materials used in binding of strain gauge . (2 marks)what is a tacho generator ?(2 marks)

41. What are the instruments used in measuring linear velocity ?(2 marks)

42. Mention some instruments that measure angular velocity ?(2 marks)
43. What do you mean by thermal sensors .mention few examples . (2 marks)

44. Write short notes on :

- I) Thermocouple
- II) Piezoelectric transducer
- III) Incremental encoder
- IV) Photovoltaic transducer
- V) Sensitivity
- VI) Hysteresis error
- VII) Stability
- VIII) Resolution

45 . compare and contrast the control system for the domestic central heating system involving a bimetallic thermostat and that involving a microprocessor ?(10 marks)

46 . explain the function of a capacitive sensor in a robot end effectors ? (10 marks)

47 . what is RTD ? explain the relationship between resistance and temperature for the RTD with temperature - resistance curve ?(10 marks)

48 . mention various components of hydraulic system ?(2 marks)

49 . what is called pneumatic system ?(2 marks)

50. List the various components of pneumatic system . (2 marks)

51. What is the purpose of using filters in hydraulic system ?(2 marks)

52. what are the factors to be considered in selecting compressors ?(2 marks)

53. state the purpose of providing air dryer .(2 marks)

- 54 . list different control valves .(2 marks)
- 55 . write objectives of using DCV's .(2 marks)
- 56 . how DCVs are classified ?(2 marks)
- 57 . list the types of pneumatic control valves . (2 marks)
- 58 . define degrees of freedom .(2 marks)
- 59 . what do you mean by a kinematic chain ?(2 marks)
- 60 . differentiate between a machine and a structure ?(2 marks)
- 61 .what is gear train ? state its function .(2 marks)
- 62 . classify gear trains . (2 marks)
- 63 . where are belt drives used ?(2 marks)
- 64 . what is the principle of relay ?(2 marks)
- 65 . list the features of synchronous motor . (2 marks)
- 66 . what is damper ?(2 marks)
- 67 . define the term electro-mechanical system .(2 marks)
- 68 . what is the function of hydraulic power system ?(2 marks)
- 69 . what is a block diagram ?(2 marks)
- 70 . what is meant by steady state error ?(2 marks)
- 71 . mention the advantages of integral control .(2 marks)
- 72 . what is a micro computer ?(2 marks)
- 73 . how are the microcontrollers described ?(2 marks)
74. Define a programmable logic controller (PLC) ? (2 marks)
75. What are the main component parts of a PLC ?(2 marks)
76. What is the function of programming devices ?(2 marks)
77. List various types of programming devices .(2 marks)

78. List down the types of buses required in a PLC.(2 marks)
79. What is ALU ? state its function .(2 marks)
80. Highlight the important role of control unit .(2 marks)
81. What is RAM ?(2 marks)
82. What is meant by program scan ?(2 marks)
83. What are counters ?(2 marks)
84. At what condition master control is used ? (2 marks)
85. What are the types of memory ?(2 marks)
86. What are the uses of sensors ?(2 marks)
87. What is an engine management ?(2 marks)
88. What is the function of decoder ?(2 marks)
89. What are the various movements of a robot ?(2 marks)
90. Point out the two main operations categories of sensors in engine management ?(2 marks)