

FUNDAMENTAL OF MECHANICAL ENGINEERING AND MECHATRONICS (KME-201T)

Unit V

Introduction to Mechatronics and actuation systems

OBJECTIVE TYPE QUESTIONS

1. Integration of electronics, control engineering and mechanical engineering is called
 - a. Electronics system
 - b. Mechanical systems
 - c. Mechatronics
 - d. Electrical system

2. Consider the following
 - i. - Mechanical engineering;
 - ii. - Electronic engineering;
 - iii. - Electrical engineering;

Which of the these are part of mechatronics?

- a. i and ii
 - b. i, ii and iii
 - c. ii and iii
 - d. i and iii
3.level of mechatronics incorporates I/O devices such as sensors, and actuators that integrates electrical signals with mechanical action.
 - a. Primary
 - b. Secondary
 - c. Third
 - d. Fourth
4.level integrates microelectronics into electrically controlled devices
 - a. Primary
 - b. Secondary
 - c. Third
 - d. Fourth
5. level incorporates advanced feedback functions into control strategy thereby enhancing the quality in terms of sophistication - called "Smart system".
 - a. Primary

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- b. Secondary
 - c. Third
 - d. Fourth
6.level incorporates intelligent control in mechatronic system.
- a. Primary
 - b. Secondary
 - c. Third
 - d. Fourth
7. Application of mechatronics leads to the products produced are cost effective and of very good quality.
- a. True
 - b. False
8. High degree of flexibility is observed when mechatronics is incorporated
- a. True
 - b. False
9. Due to mechatronics, machine utilization is lower
- a. True
 - b. False
10. Mechatronics system has lower initial cost
- a. True
 - b. False
11. It requires knowledge of various fields
- a. True
 - b. False
12. The actuators do not produce motion or cause some action.
- a. True
 - b. False
13. Actuators
- a. Produce motion
 - b. Detects the state of system
 - c. Control the system

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- d. Gives the feedback

14. Sensors

- a. Produce motion
- b. Detects the state of system
- c. Control the system
- d. Gives the feedback

15. Digital devices

- a. Produce motion
- b. Detects the state of system
- c. Control the system
- d. Gives the feedback

16. Graphical display

- a. Produce motion
- b. Detects the state of system
- c. Control the system
- d. Gives the feedback

17. Which of the following is not the example of mechatronic system?

- a. Cars
- b. Simple Bicycle
- c. Bike
- d. Aero plane

18. Which of the following is not an actuator?

- a. Solenoid
- b. Motors
- c. Thermocouple
- d. Mechanical chain

19. could be describe as an artificial word that combines automotive field and electronics content and it owns many applications in motor vehicles technology.

- a. Bionics
- b. Avionics
- c. Autotronics

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d. Robotics

20. In autotronics, fuel efficiency is increased

- a. True
- b. False

21. Autotronics decrease the safety of cars

- a. True
- b. False

22. can be defined as the flow of concepts from engineering to biology and vice versa.

- a. Bionics
- b. Avionics
- c. Autotronics
- d. Robotics

23. are the electronic systems used on aircraft, artificial satellites, and spacecrafts.

- a. Bionics
- b. Avionics
- c. Autotronics
- d. Robotics

24. The transform the energy of the process variable to an output of some other type of energy which is able to operate some control device.

- a. Sensors
- b. Actuators
- c. Transducers
- d. Feedback

25. Asensor consists of an element that changes either its state or an analog signal when it is close to, but often not actually touching, an object.

- a. Proximity
- b. Light
- c. Mass
- d. Thermal

26.sensors involve the use of compressed air, displacement or proximity of an object being transformed into a change in air pressure.

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- a. Light
- b. Mass
- c. Pneumatic
- d. Thermal

27. Photodiodes are

- a. Mass sensors
- b. Light sensors
- c. Pneumatic sensors
- d. None of these

28. Photoresistor works on principle that When the light is incident, the covalent bond breaks and many free electrons and holes are formed. Thus current is generated.

- a. True
- b. False

29. sensors measure the mass of the fluid or particles flowing through a part.

- a. Light
- b. Mass
- c. Pneumatic
- d. Thermal

30. Temperature sensors may be contact or non-contact types

- a. True
- b. False

31. works on the principle of any change in resistivity, area or length will lead to change in resistance.

- a. Capacitive transducer
- b. Resistive transducer
- c. Inductive transducer
- d. Mechanical transducer

32. Kinematic chain haslinks.

- a. 1
- b. 2
- c. 3

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d. 4

33. Kinematic chain istransducer.

- a. Electronic
- b. Mechanical
- c. Pneumatic
- d. Hydraulic

34. Gears are hydraulic transducers

- a. True
- b. False

35. Gears may be parallel or helical teeth

- a. True
- b. False

36. The shape of the teeth is such that rotation can occur in only one direction in

- a. Gears
- b. Chain
- c. Ratchet and pawl
- d. Belt

37. Slip can not be prevented in chain drives

- a. True
- b. False

38. Hydraulic actuators works on

- a. Bernoulli's principle
- b. Pascal's law
- c. Ohm's law
- d. None of these

39. Directional control valves provides flow path.

- a. True
- b. False

40. A rotary actuator is an actuator that produces a rotary motion or torque.

- a. True
- b. False

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41. An is an energy storage device: a device which accepts energy, stores energy, and releases energy as needed.
- a. Intensifier
 - b. Transducer
 - c. Accumulator
 - d. Accelerator
42. A device which increases the power of a signal in a hydraulic servomechanism or other system through the use of fixed and variable orifices is called
- a. Intensifier
 - b. Transducer
 - c. Accumulator
 - d. Accelerator
43. systems use air as the medium which is abundantly available and can be exhausted into the atmosphere after completion of the assigned task.
- a. Electronic
 - b. Mechanical
 - c. Pneumatic
 - d. Hydraulic
44. Sequencing circuits automatically move actuators in a predetermined sequence.
- a. True
 - b. False
45. Safety valve is a pressure control valve
- a. True
 - b. False
46. A servo motor is a typical example of _____
- a) Electronics system
 - b) Mechanical system
 - c) Computer system
 - d) Mechatronics system
47. Which among the following carry out the overall control of a system?
- a) Graphical display

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- b) Sensors
- c) Actuators
- d) Digital controls

48. A Mechatronics system contains feedback.

- a) True
- b) False

49. In the level of integration of Mechatronics system, an example of the first level is _____

- a) Fluid valves
- b) Automatic machine tools
- c) Industrial robots
- d) Microprocessors

50. A thermocouple is a transducer.

- a) True
- b) False

51. Which type of gear is used to convert rotary into translatory motion?

- a) Spur gear
- b) Rack and pinion
- c) Helical gear
- d) Internal gear

52. What are transducers?

- a) They convert power from one form to another
- b) They convert work from one form to another
- c) They convert work to power
- d) They convert energy from one form to another

53. What type of energy conversion does a piezoelectric transducer perform?

- a) It converts mechanical energy to sound energy
- b) It converts sound energy to mechanical energy
- c) It converts mechanical energy to electrical energy
- d) none of these

54. What is measured by a hall effect transducer?

- a) Electric flux

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- b) Electric Field
- c) Magnetic field
- d) Temperature

55. Transformer is a type of transducer.

- a) True
- b) False

56. The resistance of a thermistor is directly proportional to its temperature.

- a) True
- b) False

57. Active transducers do not require power source for operation.

- a) True
- b) False

58. Which among the following transducer is an example of active transducer?

- a) LDR (Light dependant sensor)
- b) Strain gauge
- c) Hall effect sensor
- d) Photovoltaic cell

59. What is the principle of operation of Potentiometric position sensor?

- a) Resistive Effect
- b) Hall Effect
- c) Mutual Inductance
- d) Eddy current effect

60. Which type of materials can be detected by Eddy current position sensor?

- a) Conducting materials
- b) Insulating materials
- c) Semi-Insulating Materials
- d) Amorphous Materials

61. Proximity sensor is a ____ type of position sensor.

- a) contact
- b) non-contact

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- c) eddy current
- d) resistive

62. Which type of material can be sensed by inductive proximity sensor?

- a) Wooden type
- b) Metallic type
- c) Plastic type
- d) Glass type

63. A proximity sensor requires physical contact.

- a) True
- b) False

64. In which type of system does power transmission takes place through compressed air?

- a) Fluid power system
- b) Hydraulic system
- c) Pneumatic system
- d) Stepper motors

65. The compressed air is delivered to the pneumatic system through the air compressor.

- a) True
- b) False

66. What is the function of the air dryer?

- a) Removes dirt
- b) Removes moisture
- c) Controls the rate of flow
- d) Controls the pressure

67. Which part of the Pneumatic system stores the compressed air?

- a) Air dryer
- b) Air compressor
- c) Air receiver tank
- d) Air lubricator

68. What is the function of the flow control valve?

- a) Controls the direction of flow of air
- b) The moisture is separated and removed

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- c) It converts the mechanical energy to hydraulic energy
- d) It controls the rate of flow of compressed air

69. The direction control valve controls ____

- a) direction of flow
- b) rate of flow
- c) moisture
- d) force and motion

70. What is the function of a pressure control valve?

- a) To control the force generated by actuators
- b) To perform two operations in sequence
- c) To control the direction of flow
- d) To avoid the development of excess of pressure

71. The function of the pressure relief valve is ____

- a) to open when the inlet pressure is more
- b) to control the force generated by actuators
- c) to control different parameters of the fluid
- d) to control the direction of flow

72. What is the function of the air compressor?

- a) Decreases the pressure of air
- b) Increases the pressure of air
- c) Removes dust particles
- d) Adds lubricating oil

73. What is the use of Intake air filters?

- a) To reduce the temperature of the air
- b) Used as storage and smoothened
- c) To prevent dust from entering the compressor
- d) To remove the traces of moisture

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c) Pneumatic system

d) Stepper motors

75. Hydraulic systems are slower in operation.

a) True

b) False

76. What is the purpose of pawl, when it is used against a ratchet which is attached to a shaft?

a) It allows unidirectional motion of shaft

b) It allows bidirectional motion of shaft

c) It does not allow motion of shaft

d) It is used to create additional friction force for the shaft

77. The movement of the ratchet can be locked by pawl if it moves in opposite direction.

a) True

b) False

78. Which among the following operations does not use belt drives?

a) Mining

b) Logging

c) Road construction

d) Bicycles

79. Which among the following is an advantage of using belt drives over chain drives?

a) Efficiency

b) Noise

c) Cost

d) Durability

80. Belt drives can slip.

a) True

b) False

81. Which type of joints connects the links of a chain?

a) Stationary joints

b) Pin joints

c) Bolted joints

d) Pivot joints

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82. Which type of coil is a solenoid?

- a) Electromagnetic
- b) Electrical
- c) Mechanical
- d) Chemical

83. High degree of flexibility is observed when mechatronics is incorporated

- a. True
- b. False

84. Due to mechatronics, machine utilization is lower

- a. True
- b. False

85. Mechatronics system has lower initial cost

- a. True
- b. False

86. It requires knowledge of various fields

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87. The actuators do not produce motion or cause some action.

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88. Actuators

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89. Sensors

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90. There is incorporation of intelligent, self-correcting sensory and feedback systems in

- a. Mechanical system
- b. Electronics system
- c. Mechatronics system
- d. Electrical system

91. Degree of flexibility has increased in mechatronics system.

- a. True
- b. False

92. It is cheap to incorporate mechatronics approach to an existing/old system.

- a. True
- b. False

93. LEDs and LCDs are

- a. Display devices
- b. Sensors
- c. Actuators
- d. Signals

94. In aircrafts, flight control is example of mechatronics

- a. True
- b. False

95. Washing machine is a

- a. Mechatronics system
- b. Electronics system
- c. Mechanical system
- d. None of these

96. Autotronics = X + Electronics. What is X denoting?

- a. Biology
- b. Aviation
- c. Mechanical
- d. Automobile

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97. Prosthetic arms are example of

- a. Mechatronics
- b. Bionics
- c. Avionics
- d. Autronics

98. Eddy current sensor is an

- a. Thermal sensor
- b. Pneumatic sensor
- c. Proximity sensor
- d. Light sensor

99. Strain gauges aretransducer.

- a. Inductance
- b. Proximity
- c. Light
- d. Resistance

100. Gears areactuation systems.

- a. Mechanical
- b. Electrical
- c. Pneumatic
- d. Hydraulic