Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY.

Sixth Semester B.Tech Degree (R, S) Examination May 2024 (2019 Scheme)

Course Code: RAT 308

Course name: COMPREHENSIVE COURSE WORK

Max. Marks: 50 Duration: 1Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.

1. Link or element is a

a) Part of a machine b) Stationary part of a machine c) Part of a machine which has motion relative to some other part d) All of the above

2. When the relative motion between two elements is completely or successfully constrained, then these two elements form a

a) Mechanism b) Machine c) Kinematic Pair d) Kinematic Chain

3. Which of the following is a higher pair?

a) Ball and roller bearing b) Automobile steering gear c) Cam and follower d) Belt and chain drives

4. The Coriolis component of acceleration exists only whenever a point

a) Moves along a circular path b) Moves in a straight line c) Moves along a straight line which has rotational motion d) None of the above

5. In a rigid link AB, the point B is moving with respect to A. Then the acceleration of B will be equal to

a) Acceleration of A x Distance AB b) (Acceleration of A)÷Distance AB c) Vector sum of acceleration of A and acceleration of B, relative to A d) Acceleration of A x Square of distance AB

6. A cam with a roller follower would constitute following type of pair

a) Lower pair b) Higher pair c) Close pair d) Cam pair

7. In a slider crank mechanism, the maximum acceleration of slider is obtained when the crank is

a) at the inner dead centre position b) at the outer dead centre position c) exactly midway position between the two dead centres d) slightly in advance of the midway position between the two dead centres

8. A kinematic chain requires at least

a) 2 links and 3 turning pairs b) 3 links and 4 turning pairs c) 4 links and 4 turning pairs d) 5 links and 4 turning pairs

9. Which kinematics is used to calculate the joint parameter which will be used to place at the end of the kinematic chain?

a) Forward Kinematics b) Reverse Kinematics c) Inverse Kinematics d) Backward Kinematics

10. What does degree of freedom in a kinematic chain denotes?

a) Total parameters of kinematic chain b) Length of kinematic chain c) Joints in kinematic chain d) Type of kinematic chain

11 Find the machine cycle for 8051 if XTAL =11.0592 MHz

a) 90.42 μs b) 361.68 μs c) 1.085 μs d) 150. 145 μs

12 What is the bit size of 8051 microcontroller?

a) 8 bit b) 4 bit c) 16 bit d) 32 bit

13 When the microcontroller executes some arithmetic operations, then the flag bits of which register are affected?

a) PSW b) SP c) DPTR d) PC

14 SCON in serial port is used for which operation?

a) Transferring data b) Receiving data c) Controlling d) Controlling and transferring

15 Reset work in 8051 is .....

a) To make program counter zero but values in registers made zero b) Program counter is non zero but values in registers are made zero c) Program counter is non zero but values in register remains same d) To make program counter zero but values in register remain zero.

16 How many interrupts are there in 8051 microcontrollers?

a) 3 b) 6 c) 4 d) 5

17 For writing commands on an LCD, RS bit is

a) set b) reset c) set & reset d) none of the mentioned

18 What steps must be followed for interfacing a sensor to a microcontroller 8051?

a) make the appropriate connections with the controller, ADC conversion, analyse the results b) interface sensor with ADC and ADC with 8051 c) interface sensor with the MAX232, send now to microcontroller, analyse the results d) none of the mentioned

19 What is the function of the TMOD register?

a) TMOD register is used to set various operation modes of timer/counter b) TMOD register is used to load the count of the timer c) Is the destination or the final register where the result is obtained after the operation of the timer d) Is used to interrupt the timer

20 The higher and lower bytes of a 16-bit register DPTR are represented respectively as

a) HDPTR and LDPTR b) DPTRH and DPTRL c) DPH and DPL d) HDP and LDP

21 Effect of feed back on sensitivity is minimum in

a) Open loop Control System b) Closed loop control system c) None of the mentioned d) Both of the mentioned

22 Which one of the following effect in the system is not caused by negative feed back?

a) Reduction in gain b) Increased in bandwidth c) Increase in distortion d) Reduction in output impedance

23 Insertion of negative feed back in control system affects

a) The transient response to vanish uniformly b) The transient response to decay very fast c) No change in transient response d) The transient response decays at slow rate

24 Which of the following are the not characteristics of the closed loop systems?

a) It does not compensate for disturbance b) It reduces the sensitivity of plant parameter variations c) It does not involve output measurements d) It does not has the ability to control the system transient response

25 Primary purpose of using feed back is

a) To reduce the sensitivity of the system to parameter variations
b) To increase the band width of the system
c) To reduce the noise and distortion of the system
d) To increase stability of the system

26 What are the static error constants in control system?

I. Position constant (Kp)
II. Velocity constant (Kv)
III. Acceleration Constant (Ka)

a) I & II
b) II & III
c) All of the above
d) None of the above

27 What is the need of lead compensator?

a) improves damping of the overall system
b) reduces the damping of the overall system
c) rise time and settling time decreases and Bandwidth increases.
d) overcome the undesirable oscillatory transient response

28 Systems represented by a set of delayed ordinary differential equations are called

a) Time invariant system
b) Time delay system
c) Time variant system
d) Dynamic system

29 Which unit is adopted for magnitude measurement in Bode plots?

a) Degree
b) Decimal
c) Decibel
d) Deviation

30 If the poles of a system transfer function are equal and imaginary, the system is

a) Undamped
b) Critically damped
c) Overdamped
d) Negatively damped

31 A robot configuration whose movements are referred to as base rotation, elevation (height) and reach is the

a) Cartesian Configuration
b) Cylindrical Configuration
c) Spherical Configuration
d) Anthropomorphic Configuration

32 The …… configuration requires the least floor space for a given work volume while the …….. configuration requires a larger floor space.

a) Cartesian, Articulated
b) Articulated, Rectangular
c) Cylindrical, Cartesian
d) Spherical, Cylindrical

33 Classification of robots based on arm configuration is also called classification based on

a) Coordinate system
b) Control Methods
c) Drive technologies
d) None of the above

34 Linkages, gears, cams, cables are examples of

a) Drive systems
b) Gripper Mechanisms
c) Transmission elements
d) All of the above

35 Machine idle time can be minimized by using

a) Double grippers
b) Single grippers
c) Mechanical Grippers
d) None of the above

36 To move the robot end effector along a specified path _____ motion control is necessary

a) point to point b) non-servo c) continuous path d) controlled path

37 The _____ is a cylindrical type robot whose reach is obtained using a _____ joint, instead of a _____ joint.

a) PUMA, prismatic, revolute b) PUMA, revolute, prismatic c) SCARA, prismatic, revolute d) SCARA, revolute, prismatic

38 In a friction based gripper, the gripping force required to grasp an object can be reduced by

a) Decreasing Coefficient of friction and/ or decreasing the number of contacting surfaces b) Increasing Coefficient of friction and /or decreasing the number of contacting surfaces c) Decreasing Coefficient of friction and/ or increasing the number of contacting surfaces d) Increasing Coefficient of friction and /or increasing the number of contacting surfaces

39 A manipulator with 6 DOF is a _____

a) 1-D Manipulator b) 2-D Manipulator c) 3-D Manipulator d) Spatial Manipulator

40 The Cartesian coordinate robot is of following joints

a) PRR b) PRP c) RPP d) PPP

41 Which sensor can detect nearby objects?

a) Proximity sensor b) Humidity Sensor c) Touch Sensor d) Pressure sensor

42 The monitoring of machines, gears and objects are achieved by which sensor?

a) Humidity sensor b) Proximity sensor c) Touch Sensor d) Pressure sensor

43 Which device generates output signal when metal objects are either inside or entering into sensing area.

a) Capacitive Proximity b) Magnetic Proximity c) Inductive Proximity d) Parallel Proximity

44 Inductive Proximity Sensors detect changes in the .....due to eddy currents generated on a metallic object are detected.

a) Resistance b) Capacitance c) Inductance d) Impedance

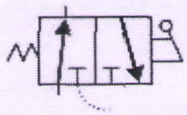
45 Which type of material can be sensed by inductive proximity sensor?

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

46 Which one of the following is a type of actuator in a hydraulic system?

a) Pump b) Valve c) Strainer d) Cylinder

47



Identify the valve description

a) Push button actuated spring returned 4/2 DCV

b) Lever actuated spring returned 3/2 DCV

c) Foot pedal actuated spring returned 3/2 DCV

d) Solenoid actuated spring returned 4/2 DCV

48 What is the purpose of timers in Ladder diagram?

a) Representing input conditions

b) Creating logical branches

c) Delaying the activation of an output

d) Performing mathematical calculations

49 How does a VFD control the speed of an electric motor?

a) By changing the voltage and frequency of the electrical supply to the motor

b) By changing the current flowing to the motor

c) By adjusting the mechanical components of the motor

d) By changing the resistance of the motor

50 A relay is superior to a mechanical switch because it _____

a) Is relatively inexpensive

b) Does not require moving contacts

c) Combines control with power amplification

d) None of the above