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Question Paper Code: 96704

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Sixth Semester

Mechanical Engineering

19UME604 - Mechatronics

(Regulations 2019)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Potentiometer transducers are used for the measurement of   CO1- U

    (a) Pressure   (b) Velocity   (c) Displacement   (d) Both (a) & (b)

2. What is the Resolution of Absolute Encoder, if it has 8 Tracks   CO1- U

    (a) 1.406 Degree   (b) 2.05 Degree   (c) 45 Degree   (d) 90 Degree

3. Which element is used to converts hydraulic power into Mechanical Power   CO1- U

    (a) Compressor   (b) Pump   (c) Actuator   (d) Convertors

4. ------- is Used to avoid the damage of Compressor due to excess pressure raise in pneumatic system   CO1- U

    (a) DC Valve   (b) Pressure Relief Valve

    (c) Flow Control Valve   (d) All of the above

5. Select the Universal Gate   CO1- U

    (a) NAND and NOR   (b) AND and OR

    (c) NOT and AND   (d) None of the above

6. Choose the correct binary Equivalent number for the decimal Number – 53.625   CO1- U

    (a) $(110101.1010)_2$ (b) $(111101.1010)_2$ (c) $(110001.1010)_2$ (d) $(100101.1010)_2$

7. ---------------- instruction is commonly used to copy the value from one address to another.   CO1- U

    (a) GET   (b) PUT   (c) MOVE   (d) None of the above

8. The acronym PLC stands for: CO1- U

   (a) Pressure Load Control   (b) Programmable Logic Controller

   (c) Pneumatic Logic Capstan   (d) Pressure Loss Chamber

9. Which phase of a mechatronics system consists of hardware designing? CO1- U

   (a) Prototyping   (b) Modeling   (c) Simulation   (d) Deployment

10. Which sensor is used in engine management system to measure burned CO5- U
    exhaust gas

    (a) Oxygen sensor   (b) temperature sensor

    (a) speed sensor   (d) Hall effect sensor

PART – B (5 x 2= 10 Marks)

11. Explain Piezoelectric Effect with Examples   CO1- U

12. Outline the symbol of SCR Neatly   CO1- U

13. Summarize the basic control modes used to control a system   CO1- U

14. Explain ON Delay and OFF delay timer with ladder diagrams   CO1- U

15. Outline the function of Oxygen sensor in Engine Management system   CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) Summarize the Construction & working of Incremental CO1- U   (16)
    Encoder & Absolute Encoder with neat sketch

    Or

    (b) Illustrate the building blocks of a Mechatronic System, CO1- U   (16)
    indicating various modules involved in it & Explain Types of
    Mechatronics System

17. (a) Explain the Construction & Working of any Three Hydraulic CO2- U   (16)
    Motor with Neat Sketch.

    Or

    (b) Illustrate the Stepper Motor Definition Clearly & Explain the CO2- U   (16)
    working of Various types of Stepper Motor with Neat Sketch

18. (a) Construct the architecture of simple Microprocessor & CO3- App   (16)
    Develop any two applications of Microprocessor Control with
    neat sketch.

    Or

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(b)   Apply the Concept of Basic System Model of Electrical   CO3- App   (16)
      system & Do the mess analysis for RL system, RC system,
      RLC system

19. (a)   Examine the Ladder Diagram for A+B+A-B- Hydraulic   CO4- App   (16)
           cylinder sequence circuit & Explain the Program flow in
           ladder diagram

                                    Or

     (b)   Examine a PLC ladder logic diagram for the application stated   CO4- App   (16)
           below
           A motor and its lubricating pump motor are both running.
           Lubrication for main motor bearings is required during motor
           coast down time. After the main motor is shut off the
           lubricating pump remains ON for a time corresponding to
           coast down time of 20 sec

20. (a)   Design a wireless surveillance Balloon using mechatronics   CO6- App   (16)
           elements and explain it in details

                                    Or

     (b)   Design a vehicle engine management system on the basis of   CO6- App   (16)
           mechatronics System design