E. DEGREE EXAMINATIONS: NOVEMBER 2009

Second Semester

MECHATRONICS ENGINEERING

U07MH201: Fundamentals of Mechatronics Engineering

ours   **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

n process to change the control is

signal   b) Control signal   c) Correction signal   d) Error signal

of input values for which there is no output is

                    b) Span   c) Sensitivity   d) Deàd Band
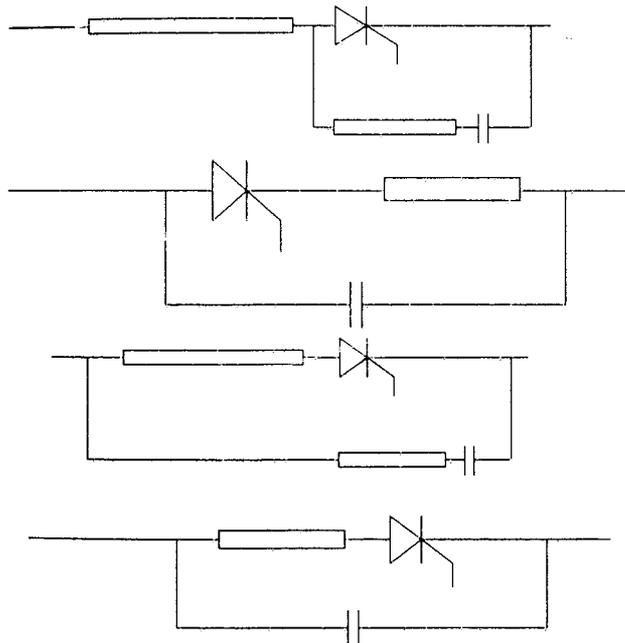
electrical switch which requires physical contact

matic Switch   b) Non – proximity switch   c) Reed switch   d) Micro switch

of condition is used in

nematic Chain   b) Four bar chain   c) Slider crank chain   d) Gear train

ch of the following is a snubber circuit?

e)

d)

6. When a current is paused through the coil with a field it causes the coil,

   a) Attraction   b) Rotation   c) Deviation   d) Translation

7. Programming in PLC is concerned with

   a) Sequence switching   b) Logic Sequence   c)Logical Switching   d) Programmed sequence

8. Which one of the following a self maintaining circuit

   a) Latch   b) Register   c) Relay   d) Timer

9. In a washing machine which of the following control is used

    a) Process control   b) Variable control   c) Automatic control   d) Sequential control

10. The control mode acting as a switch

    a) Two step mode   b) Proportional mode   c) Derivative mode   d) Integral mode

PART B (10 x 2 = 20 Marks)

11. What are the key elements in Mechatronics?

12. Write the principle involved in Hall Effect Sensor?

13. Define repeatability, Reproducibility.

14. Write a note on moment of inertia in motor selection?

15. Define a PLC unit.

16. What are the types of direction control valves?

17. What is an artificial neural network?

18. Draw the Ladder logic diagram for NOR and XOR system.

19. Define linearity.

20. What is a tactile sensor?

PART C (5 x 14 = 70 Marks)

21. (a) i) What are all the stages in designing a Mechatronics system.

      ii) Define Debouncing technique.

(OR)

   (b) i) Explain the basic elements of a closed loop control system with the help of block diagram.

      ii) Discuss the Mechatronics approach to mechanical system with an example.

22. (a) Explain the following terms
          i) Sensitivity

          ii) Hysteriss error

          iii) Stability

          iv) Resolution

          v) Output Impedance

(OR)

   (b) Explain the working principle of following sensor

        i) Piezo electric Sensor   ii) Thermocouples

23. (a) Write short notes on.
          i) Sampling
          ii) Quantization
          iii) Sequential controllers

(OR)

   (b) Sketch the basic architecture of PLC and explain the function of each element.

24. (a) (i) Explain the specifications and operations of stepper motor in detail. (10)

(ii) Define a simple slider crank mechanism. (4)

(OR)

(b) Define

    (i) Proximity Switch (4)

    (ii) Pneumatic switch (4)

    (iii) Optical encoder (6)

25. (a) i) Write a brief note on online quality monitoring system. (7)

    ii) Define the supervisory control in inspection process (7)

(OR)

(b) Draw and explain the 3 Axis pick and place robot with a Microcontroller to control the valves.

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