Question Paper

Exam Date & Time: 28-Apr-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.S. (ENGG.)
END - SEMESTER THEORY EXAMINATIONS APRIL - 2018
DATE: 28 APRIL 2018
TIME: 9:30 AM TO 12:30 PM

Elements Of Mechatronic Systems [MET 243]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1)	A)	Define the term Mechatronics. Draw the block diagram which represent all the elements of a mechatronics system.	(10)
	B)	Cathode Ray Oscilloscope (CRO) is used to measure various parameters. Explain how it is used to measure the following parameters: i) Voltage ii) Current iii) Time Draw the block diagram of a CRO.	(10)
2)	A)	Explain the construction and working of a LVDT sensor. Mention its applications.	(10)
	B)	1) Define Seebeck Effect. Describe the three laws of thermocouple with diagram. (8marks) 2) List any two applications of Resistance Temperature Detectors (RTDs). (2marks)	(10)
3)	A)	i)Define accuracy and precision. Draw suitable diagrams for the following:(5marks) a)High Precision and High Accuracy b)High Precision and Low Accuracy c)Low Precision and High Accuracy d)Low Precision and Low Accuracy ii)With the help of a diagram, explain the working principle of Magnetic Recording Display Device.(5marks)	(10)
	B)	i)When an object carrying, current I is placed in a magnetic field B, then an electric field E is induced in the object in	(10)

direction perpendicular to both I and B. (5 marks)
Answer the following:
a)What is the name of this phenomena?
b)On what principle does this phenomenon occurs?
c)Explain its working principle with a neat diagram.

ii) Explain the functions of signal conditioning equipment. (5 marks)

4) A) Draw the pin diagram of 8085 Microprocessor. List the properties of 8085. (10)

B) Explain the construction and working principles of Resistance Temperature Detector(RTD). (10)

5) A) a)Write a short note on: (10)
i)Mechanical Amplifiers
ii)Fluid Amplifiers
iii)Optical Amplifiers
(6 marks)

b)Explain fuzzification and de-fuzzification. (4 marks)

B) Draw the schematic diagram of a valve and explain its various parts. (10)

6) A) i. Describe one - way and two - way shape memory effect. (5marks) (10)
ii. Derive the expression of voltage gain for a Non - Inverting Amplifier. Draw the circuit diagram also. (5marks)

B) What is the importance of signal filtering in signal conditioning? Explain Low Pass, High Pass, Band Pass, and Band Stop Filter (10)

7) A) i. Describe the working principle of a linear solenoid. (5marks) (10)
ii. State the objectives of Data Acquisition Systems (DAS). How is data acquisition system is configured? (5marks)

B) ICAS has decided to have a multi-level car parking system in the campus. To count the number of cars getting parked daily, they decided to install a photo-electric sensor system. The transmitter and receiver are placed on the opposite ends of each other along the same plane. The output obtained is digital. The output obtained is sent to a counter. (10)

Based on the scenario given above, answer the following questions:

i)What mode of operation of photoelectric sensor has been installed?
ii)When does the reliable detection occurs?
iii)Graphically represent the output configuration of the system installed. (Take output on y-axis and time on x-axis)
iv)List the advantages and disadvantages of the installed system.

8) A) Draw the flow chart of modular approach to mechatronics and engineering design and explain it. (10)

B) Write a short note on the following: (10)

i) LIGA Process
ii) Potentiometer

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