QPC: RN20BTECH655 AR 20 Reg. No | | | | | | | | | | |

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester) Regular Examinations, November – 2023

BPEAG7021 - Mechatronics

(Age)

Time: 3 hrs Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 =10 Marks)**

Q.1. Answer ***ALL*** questions [CO#] [PO#]

a. Piezoelectric transducers are ……. Transducers. CO1 PO1

(i) Auto-pilot for an aircraft (ii) Direct current generator

(iii) Car starter (iv) Electric switch

b. Thermocouples are……. Transducers. CO1 PO1

(i) active (ii) passive

(iii) Adhesive (iv) both (i) and (iii)

c. How many windings does a 2 phase bipolar stepper motor have? CO2 PO2

(i) 2 (ii) 4

(iii) 5 (iv) 3

d. An AC signal conditioning system is normally used for CO2 PO1

(i) Resistive transducers like strain gauges (ii) Inductive and capacitive transducers

(iii) Piezoelectric transducers (iv) All of the above

e. The force developed in hydraulic systems is high due to…….. CO3 PO1

(i) High pressure (ii) More oil

(iii) Less pressure (iv) Less oil

f. PLC consists of CPU, Memory and……..circuitry. CO3 PO1

(i) Output (ii) Input

(iii) Both (i) and (ii) (iv) None of these

g. One of the main feature that distinguish microprocessor from micro-computer is _____ . CO3 PO1

(i) exactly the same as the machine cycle time (ii) words are usually larger in microprocessor

(iii) words are shorter in microprocessors (iv) microprocessor does not contain I/O devices

h. What is the full form of PLC CO1 PO1

(i) Professional logic computer (ii) Professional logic controller

(iii) Programmable logic computer (iv) Programable logic controller

i. Why do the robot need sensor ? CO4 PO1

(i) To collect information from environment (ii) To map environment attribute to a quantitative measurement

(iii) Only a is true and but b is not correct explanation of a (iv) Both a & b

j. The robot designed with polar coordinate system has _____ . CO4 PO1

(i) Three linear movements (ii) Three rotational movements

(iii) Two linear and one rotational movements (iv) Two rotational and one linear movements

PART – B: (Short Answer Questions) **(2 x 10=20 Marks)**

Q.2. Answer ***ALL*** questions	[CO#]	[PO#]
a. Why stepper motor is required?	CO2	PO1
b. What are the objectives of mechatronics?	CO1	PO1
c. Define system. What is a control system?	CO3	PO1
d. Give example for closed loop system and open loop system.	CO3	PO1
e. What are the instruments used to measure linear velocity?	CO2	PO1
f. Explain the principle of relay.	CO2	PO1
g. List down PLC programming methods.	CO3	PO1
h. List down the types of buses required in a PLC.	CO3	PO1
i. What is a position sensor?	CO2	PO1
j. Write down few applications of robot.	CO4	PO1

PART – C: (Long Answer Questions) **(10 x 4=40 Marks)**

Answer ***ALL*** questions	Marks	[CO#]	[PO#]
3. a. Write a short notes on three main components of a mechatronic system.	5	CO1	PO1
b. Explain the photo-electric transducer with proper diagram.	5	CO1	PO1
(OR)			
c. Differentiate between D.C motor and Stepper motor.	4	CO2	PO1
d. Explain Pneumatic Actuation System with suitable sketch.	6	CO3	PO1
4. a. Explain the advantage of Pulse Amplitude Modulation.	5	CO2	PO2
b. What does data acquisition mean? Explain its purpose for use.	5	CO2	PO2
(OR)			
c. Explain the multiplexers with suitable diagram and explain it's working principle.	10	CO2	PO2
5. a. Differentiate between Microprocessor and Microcontroller.	5	CO3	PO1
b. Define PLC and its importance in Industry 4.0.	5	CO4	PO1
(OR)			
c. Write down the various applications of microcontroller.	3	CO3	PO1
d. Explain Micro-computer structure .	7	CO2	PO1
6. a. Explain the robot and write the advantages and disadvantages of robot.	5	CO4	PO1
b. Write the working function of robot in manufacturing industry to make a car body assembly.	5	CO4	PO1
(OR)			
c. Explain the robot nomenclature with various components through suitable diagram.	5	CO4	PO1
d. Illustrate the working principle of robot application in painting.	5	CO4	PO2

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