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## GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2022

### 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. In closed-loop system, with positive value of feedback gain the overall gain of the system will | CO3   | PO1   |
| (i) Decrease   |       |       |
| (ii) Increase  |       |       |
| (iii) Be unaffected  |       |       |
| (iv) Any of the above  |       |       |
| b. A transducer is basically a device which converts _____ .                                       | CO1   | PO1   |
| (i) Mechanical energy into electrical  |       |       |
| (ii) Energy or information from one form to another  |       |       |
| (iii) Mechanical displacement into electrical  |       |       |
| (iv) None of these   |       |       |
| c. Which type of coil is a solenoid?   | CO1   | PO1   |
| (i) Electromagnetic  |       |       |
| (ii) Mechanical  |       |       |
| (iii) Electrical   |       |       |
| (iv) Chemical  |       |       |
| d. Filters that transmit all frequencies below a defined cut-off frequency are known as            | CO2   | PO1   |
| (i) Low-pass filters   |       |       |
| (ii) High-pass filters   |       |       |
| (iii) Band-pass filters  |       |       |
| (iv) Any of these  |       |       |
| e. Hydraulic ..... is equivalent of a spring in mechanical systems.                                | CO3   | PO1   |
| (i) Resistance   |       |       |
| (ii) Permittivity  |       |       |
| (iii) Inertance  |       |       |
| (iv) None of these   |       |       |
| f. Rotary motion in a hydraulic power unit is achieved by using _____ .                            | CO3   | PO1   |
| (i) Hydraulic cylinder   |       |       |
| (ii) Pneumatic cylinder  |       |       |
| (iii) Both (i) and (ii)  |       |       |
| (iv) None the above  |       |       |
| g. The PLC is used in _____ .  | CO3   | PO1   |
| (i) machine tools  |       |       |
| (ii) automated assembly equipment  |       |       |
| (iii) mounding and extrusion machines  |       |       |
| (iv) All of the above  |       |       |
| h. Which among the following applications are not microcontroller based?                           | CO3   | PO1   |
| (i) Computer system  |       |       |
| (ii) Washing machines  |       |       |
| (iii) MP3 players  |       |       |
| (iv) Telephones  |       |       |
| i. Which of the following sensor work based on radio detection and ranging ?                       | CO2   | PO1   |
| (i) Sonar  |       |       |
| (ii) Radar   |       |       |
| (iii) Inertial   |       |       |
| (iv) Biosensor   |       |       |
| j. In which of the following operations continuous path system is used _____ .                     | CO4   | PO1   |
| (v) Pick and place   |       |       |
| (vi) Load and unloading  |       |       |
| (vii) Continuous welding   |       |       |
| (viii) All the above   |       |       |

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

	[CO#]	[PO#]
a. Write the limitations of Mechatronics.	CO1	PO1
b. What is static characteristics of instruments?	CO1	PO1
c. Mention the examples of automatic system?	CO2	PO1
d. Enumerate the elements of a control system?	CO3	PO1
e. State the purpose of using potentiometer in displacement sensor?	CO2	PO1
f. List out different control valves?	CO3	PO1
g. What is ALU? State its function.	CO3	PO1
h. Highlight the important role of control unit.	CO3	PO1
i. What are the terms that define the performance of the transducers?	CO4	PO1
j. Write the advantages of robot.	CO4	PO1

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

	Marks	[CO#]	[PO#]
3. a. Explain the importance of mechatronics with few examples.	5	CO1	PO1
b. Classify various sensors and briefly explain their applications.	5	CO2	PO1
(OR)			
c. Write down the advantages and disadvantages of mechatronics?	5	CO1	PO1
d. Explain flow transducer and it's importance.	5	CO3	PO1
4. a. Explain the system modelling and control with suitable example.	5	CO3	PO2
b. Make a short note for the analysis of measurement system as the mechatronics system with example.	5	CO3	PO2
(OR)			
c. Explain the hydraulic mechanical system with suitable example and figure.	10	CO3	PO2
5. a. Explain the role of computer and interfacing for the system application.	7	CO2	PO2
b. Define PLC and it's importance.	3	CO3	PO2
(OR)			
c. Explain the modelling and simulation of a dynamic system with suitable diagram.	10	CO3	PO2
6. a. Explain the degree of freedom for the robot and its importance.	5	CO4	PO1
b. Differentiate between Cartesian robot and spherical robot with suitable diagram.	5	CO4	PO1
(OR)			
c. List out various applications of robot.	5	CO4	PO1
d. Explain the working principle of robot used in welding process.	5	CO4	PO1

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