

**B.E DEGREE EXAMINATIONS: NOV/DEC 2014**

(Regulations 2009)

Seventh Semester

**MECHANICAL ENGINEERING**

MEC123: Mechatronics

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. The device which converts one form of energy into another is called a \_\_\_\_\_.
  - a) Transistor
  - b) transducer
  - c) PLC
  - d) micro controller
2. Photodiodes are reverse-biased in an optical sensory circuit for obtaining \_\_\_\_\_.
  - a) low resistance
  - b) average resistance
  - c) high resistance
  - d) equal resistance
3. What type gas should normally be used to charge an accumulator?
  - a) Oxygen
  - b) Compressed air
  - c) Nitrogen
  - d) Acetylene
4. The angle through which rotor rotates for one switching change for the stator coils is called as \_\_\_\_\_.
  - a) Step angle
  - b) mount angle
  - c) slew
  - d) phase
5. The forces opposing motion in a mechanical system block is \_\_\_\_\_.
  - a) dashpots
  - b) spring
  - c) mass
  - d) load
6. Which controller is never used alone?
  - a) Proportional
  - b) Integral



**(OR)**

- b) (i) With neat sketch explain the incremental encoder. (7)
- (ii) Illustrate the working principle of Hall Effect sensor with a neat diagram. (7)

- 22. a) (i) With neat sketch explain the semi rotary actuator. (7)
- (ii) Explain the types of Bearings with neat sketches. (7)

**(OR)**

- b) Explain the working principle of D.C motors with neat sketches and also explain the speed control of D.C motor using H circuit.

- 23. a) Derive the mathematical equation which relates the input of displacement  $x_i$  and output of displacement  $x_o$  of a load in a hydraulic - mechanical system.

**(OR)**

- b) (i) Explain the principle and characteristics of the integral controller with neat sketches. (7)
- (ii) Explain the model reference type of adaptive controller with neat sketches. (7)

- 24. a) Sketch the basic architecture of a PLC and explain the various components involved.

**(OR)**

- b) (i) With an example explain the internal relay in PLC. (7)
- (ii) How the shift register is used in PLC? Explain with an example. (7)

- 25. a) (i) What are the various stages in designing a mechatronics system? Explain. (7)
- (ii) With neat sketch explain mechatronics approach for windscreen-wiper motion. (7)

**(OR)**

- b) Design a mechatronics system for an automatic car park system with a neat block diagram.

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