PNS SCHOOL OF ENGG AND TECHNOLOGY

TH-4(MECHATRONICS)

5TH SEM MECHANICAL

PART-A **FM-20**

ANSWER ANY FIVE QUESTIONS. 5*2=10

Q1.DEFINE TRANSDUCER SENSITIVITY.

Q2.CLASSIFY TRANSDUCER.

Q3. DEFINE TEMPERATURE SENSOR.

Q4.DEFINE ACTUATOR AND ITS TYPES.

Q5.DEFINE KINEMATIC LINK AND MACHINE.

Q6.DEFINE SWITCH AND RELAY.

PART-B **2*5=10**

ANSWER ANY TWO QUESTIONS

Q1.WRITE THE ADVANTAGES AND DISADVANTAGES OF MECHATRONICS.

Q2.WORKING PRINCIPLE OF ELECTROMECHANICAL TRANSDUCER.

Q3.WRITE THE WORKING PRINCIPLE OF SOLENOID AND ITS APPLICATION.

INTERNAL ASSESMENT TH-4

PART-A

Q1.DEFINE TRANSDUCER SENSITIVITY.

ANS-Transducer sensitivity is defined as the ratio of an output quantity to an input quantity.
Sensitivity is a key indicator of a transducer's performance.

Q2.CLASSIFY TRANSDUCER.

ANS-There are many principles on which a transducer can work like resistive, inductive, capacitive etc. So Transducer can be categorized on the basis of four thoughts. On the basis of transduction form it`s used, we can go further.

1. Primary and secondary type
2. Analog and digital type
3. Active and passive type
4. Transducer and Inverse type

Q3. DEFINE TEMPERATURE SENSOR.

ANS-Temperature Sensors measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to "sense" or detect any physical change to that temperature producing either an analogue or digital output.

Q4.DEFINE ACTUATOR AND ITS TYPES.

ANS-An actuator is a machine part that initiates movements by receiving feedback from a control signal. Once it has power, the actuator creates specific motions depending on the purpose of the machine.

Q5.DEFINE KINEMATIC LINK AND MACHINE.

ANS-A kinematic link or element or link is **a resistant body that constitutes part of the machine, connecting other parts which have motion relative to it.**

machine is a physical system using power to apply forces and control movement to perform an action.

Q6.DEFINE SWITCH AND RELAY

ANS-The Relay is a electrically operated switch and Switch is a electrical component that can break an electrical circuit. Many relays use an electromagnet to mechanically operate a switch

LONG QUESTION ANSWER

Q1 WRITE ADVANTAGES AND DISADVANTAGES OF MECHATRONICS

ANS-ADVANTAGES:

1. THE PRODUCTS PRODUCED ARE COST EFFECTIVE AND OF VERY GOOD QUALITY.

2. THE PERFORMANCE CHARACTERISTICS OF MECHATRONICS PRODUCTS ARE SUCH WHICH ARE OTHERWISE VERY DIFFICULT TO

ACHIEVE WITHOUT THE SYNERGISTIC COMBINATION.

3. HIGH DEGREE OF FLEXIBILITY.

4. A MECHATRONICS PRODUCT CAN BE BETTER THAN JUST SUM OF ITS PARTS.

5. GREATER EXTENT OF MACHINE UTILIZATION.

6. DUE TO THE INTEGRATION OF SENSORS AND CONTROL SYSTEMS IN A COMPLEX SYSTEM, CAPITAL EXPENSES ARE REDUCED

7. OWING TO THE INCORPORATION OF INTELLIGENT, SELF-CORRECTING SENSORY AND FEEDBACK SYSTEMS, THE MECHATRONIC

APPROACH RESULTS IN:

- GREATER PRODUCTIVITY;

- HIGHER QUANTITY AND PRODUCING RELIABILITY.

DISADVANTAGES:

1. HIGH INITIAL COST OF THE SYSTEM.

2. IMPERATIVE TO HAVE KNOWLEDGE OF DIFFERENT ENGINEERING FIELDS FOR DESIGN AND IMPLEMENTATION.

3. SPECIFIC PROBLEMS FOR VARIOUS SYSTEMS WILL HAVE TO BE ADDRESSED SEPARATELY AND PROPERLY.

4. IT IS EXPENSIVE TO INCORPORATE MECHATRONICS APPROACH TO AN EXISTING/OLD SYSTEM.

Q2.WORKING PRINCIPLE OF ELECTROMECHANICAL TRANDUCER.

ANS-

- A TRANSDUCER FOR RECEIVING WAVES FROM AN ELECTRIC SYSTEM AND DELIVERING WAVES TO A MECHANICAL SYSTEM, OR VICE VERSA. IS KNOWN AS ELECTROMAGNETIC TRANSDUCER.
- MANY OF THE TRANSDUCERS USED IN EVERYDAY LIFE

  OPERATE IN BOTH DIRECTIONS, SUCH AS THE SPEAKERPHONE .

WORKING PRINCIPLE-

- IT IS A DEVICE FOR CONVERTING MECHANICAL MOTION INTO VIBRATIONS OF ELECTRIC CURREENT OR VOLTAGE AND VICE VERSA
- THESE ARE USED PRIMARILY AS ACTUATING MECHANISM IN AUTOMATIC CONTROL SYSTEMS AND AS A SENSORS OF MECHANICAL MOTION IN AUTOMATION AND MEASUREMENT TECHNOLOGY.
- THEY MAY BE CLASSIFIED ACCORDING TO THE CONVERSION PRINCIPLE USED AS RESISTIVE, ELECTROMAGNETIC AND ELECTROSTATIC TYPE.
- THEY MAY BE ALSO CLASSIFIED ACCORDING TO THE TYPE OF OUTPUT SIGNAL AS ANALOGUE AND DIGITAL TYPES.
- THESE ARE EVALUATED WITH RESPECT TO THEIR EVALUATED WITH RESPECTIVE TO THEIR STATIC ANDDYNAMIC CHARACTERISTICS AND SENSITIVITY
- IT ALSO DEPENDS UPON THE OPERATING FREQUENCY RANGE OF THE OUTPUT SIGNAL ,STATIC ERROR OF THE SIGNAL AND STATIC ERROR OF CONVERSION.

Q3.WRITE THE WORKING PRINCIPLE OF SOLENOID AND ITS APPLICATION

ANS-

The solenoid simply works on the principle of “electromagnetism”. When the current flow through the coil magnetic field is generated in it, if you place a metal core inside the coil the magnetic lines of flux is concentrated on the core which increases the induction of the coil as compared to the air core.

Like all magnets, the magnetic field of an activated solenoid has positive and negative poles that will attract or repel material sensitive to magnets. In a solenoid, the electromagnetic field causes the piston to either. Move backward or forward, which is how motion is created by a solenoid coil.