Student Exam No._____

GANPAT UNIVERSITY

B. TECH. SEM VI MECHATRONICS ENGINEERING

REGULAR EXAMINATION MAY – JUNE 2013

2MC605 SENSOR SYSTEMS

Time: 3 Hours **Total Marks: 70**

Instruction: 1 All questions are compulsory
2 Figures to right indicates full marks
3 Draw appropriate diagram wherever necessary

SECTION - I

Que. – 1 Attempt all 12

(a) Design a circuit to glow lamp in absence of proper illumination using LDR whose resistance varies from 85 KΩ to 122 KΩ.

(b) Derive the equation for sensitivity of strain gauge.

(c) Differentiate inductive and capacitive proximity sensors from the application point of view and explain their working with figure.

OR

Que. – 1 Attempt all 12

(a) Design Band pass filter for the system that uses frequency variation from 500Hz to 800Hz to carry measurement information and draw circuit(Pass band gain is 4).

(b) What is biosensors ? what are the applications and development considerations in biosensors?

(c) Enlist various automotive sensors and their applications.

Que. – 2 Attempt all 11

(a) What are the advantages of flash ADC ? Explain working with figure.

(b) Explain working of absolute encoders with figure.

OR

Que. – 2 Attempt all 11

(a) Explain electrical, mechanical and thermal characterization of sensors.

(b) Draw the figure of angular arm type float level sensor with potentiometer and explain its working

Que. – 3 Attempt all 12

(a) Enlist various devices used for pressure measurement and application considerations for pressure sensors.

(b) Differentiate active and passive sensors. Enlist various active and passive sensors, also differentiate sensor and transducers.

(c) Explain thermoresistive and piezoelectric effect.

SECTION – II

Que. – 4 Attempt all 12

(a) Which are the three configurations of capacitive devices used to measure angular and linear position ? Explain with figure.

(b) Which principle is used in O_2 sensors ? Explain O_2 sensor in detail with figure.

(c) What is the function of filter ? Explain high pass, low pass and band pass filters.

OR

Que. – 4 Attempt all 12

(a) What is MEMS ? Explain any two MEMS in detail with figure.

(b) Differentiate between thermistors, thermocouple and RTD based on their working and application consideration.

(c) Explain sampling and quantization with figure and also explain their importance.

Que. – 5 Attempt all 11

(a) Explain working of successive approximation ADC with figure.

(b) Explain working of incremental encoders with figure.

OR

Que. – 5 Attempt all 11

(a) Differentiate between potentiometric, amperometric and conductometric electrochemical sensors. Give the example of each.

(b) How does instrumentation works? Explain with figure and derive the equation of gain.

Que. – 6 Attempt all 12

(a) Explain accuracy, precision, resolution and MDS.

(b) Explain threshold, sensitivity, selectivity and hysteresis.

(c) Explain Doppler effect and hall effect

END OF PAPER