

# BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2008 Examinations

Programme: INSTRUMENTATION & CONTROL

Course/Subject: BASIC INSTRUMENTATION-II (S-4216)

Time Duration: 3 Hrs.

Max. Marks: 75

- INSTRUCTIONS:**
1. All Questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable additional data if required.

Q.No.1. Answer the following:- (3X5=15)

- a) What are the modes of operation of a piezoelectric crystal?
- b) What is the function of filters? Sketch frequency response of any four types of filters.
- c) State the input - output relationships and typical specifications of following:-
  - i) Charge amplifier.
  - ii) Differentiator.
- d) Write a note on ultra violet recorders.
- e) What are the types of errors and remedial actions?

Q.No.2. Answer any two:- (2X6=12)

- a) Explain piezoelectric effect. Draw and explain equivalent circuit of piezoelectric crystal. How can force be measured using the same?
- b) Differentiate between working principle, construction and operation of moving coil type transducers and moving magnet type transducers.
- c) Explain working principle, Construction and compare.
  - i) absolute encoder.
  - ii) incremental encoder.

Q.No.3. Answer any two:- (2X6=12)

- a) Describe working principle and construction of fiber optic transducers. How is it useful in measurement of level?
- b) What is signal conditioning? How are signal conditioning elements classified?
- c) Explain basic concept, input - output relationships and typical specifications of:
  - i) Hydraulic amplifier.
  - ii) Rack and pinion gear.

Q.No.4. Answer any two:- (2X6=12)

- a) State input-output relationships and typical specifications of:
  - i) DC amplifier.
  - ii) Amplitude modulators.
  - iii) V to I converters.

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Q.No.4. Contd../-

- b) Explain operation of wheat stone bridge. Obtain its balance equation. Compare:
  - i) Null and deflection type bridge.
  - ii) ac/dc excitation.
- c) Explain the classification of data presentation elements.

Q.No.5. Answer any two:- (2X6=12)

- a) Explain construction, working and typical specifications of:
  - i) Servo recorders.
  - ii) Mechanical pointers.
- b) Write notes on: i) Magnetic type recorder.
  - ii) X - Y plotter.
- c) Explain the following terms, and their significance in measurement systems:
  - i) Accuracy.
  - ii) Precision.
  - iii) Sensitivity.

Q.No.6. Answer any two:- (2X6=12)

- a) Explain the terms:
  - i) Linearity
  - ii) Hysteresis.
  - iii) impedance matching.
- b) Describe response of second order system to a step input. What are the step response specifications?
- c) Write note on shielding, grounding and coupling techniques.

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# BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

May/June, 2009 Examinations

Programme: ELECTRONICS & INSTRUMENTATION/IS

Course/Subject: BASIC INSTRUMENTATION-II (S4216)

Time Duration: 3 Hrs.

Max. Marks: 75

**INSTRUCTIONS:** 1.All Questions are compulsory.  
2.Figures to the right indicate full marks.  
3.Assume suitable additional data if required.

Q.1. Ans the following. (Any five)

3x5=15

- i) Explain working principle of tachometer encoder.
- ii) What are the characteristics of an Ideal Operational amplifier.
- iii) What is recorder? What are the different types of it?
- iv) List different types of errors.
- v) Explain balance equation of wheatstone bridge.
- vi) Explain pneumatic type magnetic amplifier.

Q.2. Ans the following. (Any two)

2x6=12

- i) Explain the force measurement by using Piezoelectric transducer.
- ii) Explain working principle of fibre optic transducer. What are the advantages of this Sensor.
- iii) Explain construction and working principle of moving magnet type transducer, What are the advantages of it?

Q.3. Ans. the foll. (Any 2)

2x6=12

- i) Explain any two techniques of analog to digital converters.(ADC).
- ii) Explain different types of filters with their frequency response Curves.
- iii) Explain hydraulic type mechanical amplifier.

Q.4. Ans. the foll.(Any 2)

2x6=12

- i) Explain X - Y plotter in detail with neat diagram.
- ii) Explain block diagram of C R O.
- iii) Explain working of pen recorder.

Q.5. Ans. the following.

2x6=12

- i) Define & explain the significance of (a) Resolution (b) Drift (c) Hysteresis.
- ii) What are the remedial actions of different types of errors.

Q.6. Ans. the following. (Any two)

2x6=12

- i) Explain dynamic response of second order system to step I/P and Sinusoidal I/P.
- ii) Explain Frequency response specifications of A C & D C devices.
- iii) Define the significance of
  - a) Impedance loading & impedance matching.
  - b) Sensitivity
  - c) Accuracy.

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