

Total number of printed pages-3

53 (IE 302) FNIN

2018

## FUNDAMENTAL OF INSTRUMENTATION

Paper : IE 302

Full Marks : 100

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

***Answer any five questions.***

1. (a) What is rise time? 2
- (b) What are the significance of linear system? 4
- (c) Describe the different standards. 6
- (d) In a certain manufacturing process, the length of shafts produced has a mean length of 300cm and a standard deviation of 1 cm. If shaft diameter range from 297 to 303cm is acceptable, how many rejections would you expect in a random list of 10000 shafts? 8

Contd.

2. (a) What is the input impedance of a non-inverting operational amplifier? 2
- (b) Define Hysteresis and Resolution. 4
- (c) What are the human errors? Explain. 6
- (d) Draw the block diagram of weight measurement system and describe in brief all functional blocks. 8
3. (a) Write two systematic error. 2
- (b) Draw the differential amplifier circuit and derive the output equation. 4
- (c) Explain with circuit diagram of op-amp based voltage to current converter with grounded load. 6
- (d) Write Gaussian distribution equation. Find out mean absolute deviation, mode and median of 10, 11, 12, 10, 11, 12, 13, 11, 9. 8
4. (a) Why 4-20 mA is used? 2
- (b) "A buffer can be used to reduce loading effect". Justify the statement. 4
- (c) Define the following terms :  
(i) Precession (ii) Accuracy (iii) Linearity. 6

- (d) Define the following : 8
  - (i) Current Standard
  - (ii) Voltage Standard
  - (iii) Capacitance Standard
  - (iv) Time and frequency Standards.
5. (a) What are the differences between null type and deflection type bridges? 2
- (b) Discuss the characteristics of an ideal operational amplifier. 4
- (c) What are the different methods of calibration in measurement? 6
- (d) Write a short note on Fundamental SI units? 8
6. (a) How voltmeter is calibrated? 2
- (b) A 400mA ammeter has an internal resistance of  $10\Omega$ . For extending its range to measure 2A, find the shunt resistance required. 4
- (c) Draw the instrumentation amplifier circuit with output equation and advantages. 6
- (d) Write a short note on Curve Fitting and Method of Least Squares. 8

НИТЯНОЕ ИЛИ ПЕРЧАТКИ

Видов 22, из них 11

Видов 22, из них 11

ПОЛТАВЕНСКОЕ ИЛИ ПОЛТАВЕНСКОЕ

Содерж.