

**DEPARTMENT OF MECHANICAL ENGINEERING  
QUESTION BANK**

**Subject Name: ME-310 F MEASUREMENTS & INSTRUMENTATION**

**Sem: VI ME**

PART A

1. Define the terms precision and sensitivity.
2. What is the significance of calibration?
3. Write any four types of analog ammeter used for instrumentation.
4. What are the different methods used for frequency measurement in power frequency range?
5. What are the applications of potentiometers?
6. What are the sources of Electromagnetic interference?
7. Distinguish between LED and LCD.
8. What are the functions of data logger?
9. What are the factors to be considered for selection of transducers?
10. Mention any four types of Analog to Digital convertor?

PART B - (5 x 16 = 80 marks)

11. (a) Describe the functional elements of an instrument with a block diagram and draw the static and dynamic characteristics.

Or

11. (b) A circuit was tuned for resonance by eight different students and the value of resonant frequency in KHz were recorded as 532, 548, 543, 535, 546, 531, 543 and 536. Calculate

- (i) Arithmetic mean.
- (ii) Deviation.
- (iii) Average deviation.
- (iv) Standard deviation.

12. (a) Describe the construction and working of permanent magnet moving coil instrument. Also derive the expression for deflection.

Or

12. (b) Write short notes on :

- (i) Current transformer.
- (ii) Weston frequency meter.

13. (a) Explain how the inductance is measured in terms of known capacitance using Maxwell's bridge. Derive the conditions for balance.

Or

13. (b) Explain the following :

- (i) Grounding techniques.
- (ii) Causes of Electromagnetic measurements in measurements.

14. (a) With neat diagram, explain the basic components and working principle of magnetic tape recorder.

Or

14. (b) With the help of the fundamental block diagram, explain the working principle of digital storage oscilloscope, mention its advantages over analog CRO?

15. (a) Explain the construction and working principle of linear variable differential transformer (LVDT).

Or

15. (b) (i) What is data acquisition system? With generalized block diagram, explain the functions of it.  
(ii) Write short notes on smart sensors.

#### PART A

1. Mention the significance of measurements.
2. Compare Moving coil with Moving iron instruments.
3. Draw the internal structure of CRT and list its functions.
4. What are the two significant problems with diodes when used for RF rectification?
5. What is Barkhausen Criteria for sustained oscillation?
6. Draw the block diagram of spectrum analyzer.
7. What are the advantages of digital instruments over analog instruments?
8. What are the different types of Digital Voltmeter?
9. Draw the block diagram of Digital Data Acquisition System.
10. What are the key features of fully automatic digital instruments?

#### PART B

11. (a) (i) What is the need for standards of measurements? How they are classified? Explain

(ii) How the unknown frequency is measured using Wein bridge method?

Or

(b) (i) What are the different types of errors in measurement? Explain.

(ii) How do you measure the unknown inductance using Hay Bridge?

12. (a) (i) Draw the block diagram of sampling oscilloscope and explain the principle.

(ii) Explain the measurement of quality factor of a coil.

Or

(b) (i) Discuss the measurement of DC and AC voltages and currents using an Electronic Multimeter.

(ii) Draw the block diagram of True RMS reading voltmeter and explain its operation.

13. (a) (i) Explain how function generator generates sine wave, triangular wave and square wave.

(ii) Draw the block diagram of sweep-frequency generator and explain.

Or

(b) (i) What is wave analyzer? How it analyzes the harmonics? Explain.

(ii) Explain the vector network analyzer and list its application.

14. (a) (i) How computer controlled measurement system is used for testing radio receiver?

(ii) What is virtual instrument? List the advantages of virtual instrument over conventional instrument

Or

(b) (i) With necessary diagrams explain Ramp type digital voltmeter.

(ii) Draw the block diagram of digital frequency meter and explain.

15. (a) (i) What are the factors to be considered while interfacing transducers to electronic control and measuring systems?

(ii) Draw the block schematic representation of the IEEE 488 instrumentation bus and explain.

Or

(b) (i) Explain the optical time domain reflectometer with a neat diagram.

(ii) Write a detailed note on data loggers.