

Sl. No. of Question Paper: 1454

Unique Paper Code : 2511305

Name of the Paper : INDUSTRIAL INSTRUMENTATION

Name of the Course : B. Tech Instrumentation

Semester : III

Duration : 3 Hours

Maximum Marks : 75

F-7

Attempt **FIVE** questions in all. Question No. 1 is compulsory. Use of non-programmable scientific calculator is permitted.

Set A

- Q1 A Describe the operation of a vacuum pump based on the ionization principle. (3)
- B What is the principle behind the working of ^{an} infrared moisture measuring system? (3)
- C Explain the principle of a turbine type flow meter with a neat diagram. (3)
- D What are the different types of refrigerants available? Discuss ^{the} advantages of each type. (3)
- E Convert a pressure of 33 centimeter water (cm. H₂O), to a pressure expressed in millimeter mercury (mm. Hg) without using conversions. (3)
- Q2.A Describe the construction and working of a flow meter based on Faraday's law of electromagnetic induction. (5)
- B The speed of a shaft rotating at 2880 rpm is measured using a stroboscope. The stroboscope dial is slowly turned from setting of 4320 rpm to 1400 rpm corresponding to flash rate of 94 to 24 per second (a) Indicate the speed settings which give single, double & triple steady images. (b) What is the observation when the flashing rate is 50 per second? (5)
- C How can you use an LVDT circuit to record a graph? Explain its design and working. (5)
- Q3. A While measuring ^{the} speed of a steam turbine with ^a stroboscope single line images were observed for stroboscope setting of 1000, 2000 and 2230 rpm. Calculate ^{the} speed of ^{the} turbine. (4)
- B Can we use an accelerometer for pumping gas in airbags at the time of collision in cars? Support your answer. If no, then which sensor would you prefer? (6)
- C ^{What is an} Briefly explain impact printer which has main application ⁱⁿ of bulk printing? (5)
- Q4. A Explain the operation of X-Y recorder, ^{and its applications.} Give its applications also. (5)
- B Draw and explain the working of a venturimeter. Give its advantages. (5)

- C The frequency of a signal to be recorded with a strip chart recorder is 15 ~~Hz~~. What chart speed must be used to record one complete cycle on a 5mm of recording paper? (5)
- Hz. ~~15 Hz~~
- Q.5 A How ^{is} dew point ~~is~~ associated with relative humidity? How ^{is} dew point ~~is~~ determined in industries? (6)
- B How ^{can} absolute pressure ~~can~~ be measured with the help of two bellow elements? (4)
- C What are the various standard pressure devices used for testing & calibration of pressure devices? Explain. (5)
- Q6. A Explain different types of compressors and evaporators used in a refrigerator. (6)
- B What are the objectives and requirements of recording data? (4)
- C A venture tube of throat diameter 60mm is placed in a water pipe of 200mm to measure the volumetric flow. The volumetric flow rate through the tube is $0.08\text{m}^3/\text{s}$ ~~the~~ the water has a density of 10^3 kg/m^3 and viscosity of 10^{-3}Ns/m^2 . Determine Reynold's number for these conditions. (5)
- Q7. A Is it possible to link ^a C-type bourdon tube with ^{an} LVDT for pressure measurement? ~~Support~~ your answer. (1+5)
- B ^{What are the} ~~Explain~~ different types of hygroscopic materials used for the construction of hygrometers? ^{Give reasons for} (4)
- C Describe with neat sketches, the working of an ultrasonic type of flow meter. (5)