GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022
B. Tech Degree Examinations, May – 2021
(Eighth Semester)
BEIOE 8031 – INDUSTRIAL INSTRUMENTATION
(Common to Biotechnology and Chemical Engineering)

Time: 2 hrs   Maximum: 50 Marks

Answer ALL Questions
The figures in the right hand margin indicate marks.
PART – A: (Multiple Choice Questions)   (1 x 10 = 10 Marks)

Q.1. Answer *ALL* questions

a. Which of the following is used as a source in the simple infrared analyser for gas analysis?
   (i) Tungsten filament lamp   (ii) Nernst glower
   (iii) Hot-wire spiral   (iv) Mercury arc lamp

b. Which of the following is the chopping frequency used for industrial analysers in the simple infrared analyser for gas analysis?
   (i) 2-10 Hz   (ii) 2-50 Hz
   (iii) 2-100 Hz   (iv) 2-150 Hz

c. Which of the following does not occur in Hartman and Braun oxygen analyser based on the magnetic wind?
   (i) Oxygen is attracted to the magnetic field   (ii)Oxygen becomes less paramagnetic due to rise in temperature
   (iii)Resistance change in a resistance connected to the Wheatstone bridge occurs   (iv) Wheatstone Bridge becomes balanced due to temperature change

d. Radio telemetry is useful when source and receiver is at _____
   (i) Long distance separation   (ii) Short distance separation
   (iii) Varying separation distance   (iv) All of the mentioned

e. In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure?
   (i) Column chromatography   (ii) Planar chromatography
   (iii) Liquid chromatography   (iv) Gas chromatography

f. X-ray diffractometers are not used to identify the physical properties of which of the following?
   (i) Metals   (ii) Liquids
   (iii) Polymeric materials   (iv) Solids

g. The function of the ignition system is to _____ the flame propagation process.
   (i) stop   (ii) initiate
   (ii) balance   (iv) none of the mentioned

h. An ignition process obeys the law of _____
   (i) conservation of mass   (ii) conservation of energy

(iii) conservation of momentum   (iv) both (i) and (ii)

i. The sequence of operations in which PCM is done is

  (i) Sampling, quantizing, encoding   (ii) Quantizing, encoding, sampling

  (iii) Quantizing, sampling, encoding   (iv) Sampling, encoding, quantizing

j. In digital transmission, the modulation technique that requires minimum bandwidth is

  (i) Delta modulation   (ii)   PCM

  (iii) DPCM   (iv)   PAM

PART – B: (Short Answer Questions)   (2 x 5 = 10 Marks)

Q.2. Answer *ALL* questions

  a. What is known by dynamic calibration? How is it performed in a second order under damped system?

  b. Differentiate TDM and FDM.

  c. State with examples of necessity of moisture measurements in liquid.

  d. Define MTTF. Write the relationship between MTTF and reliability.

  e. List the various causes for drift observed in an instrument?

PART – C: (Long Answer Questions)   (6 x 5 = 30 Marks)

Answer *ANY FIVE* questions   Marks

3. Explain the operation of a typical wireless I/O system with neat diagram.   (6)

4. Discuss various statistical methods of error analysis. Write the statistical formula and discuss their significance.   (6)

5. List various sensors/instruments used for the measurement of pressure, temperature, flow, level and vibration in a power plant.   (6)

6. Write short notes on i) Gas chromatography ii) Frequency telemetering.   (6)

7. What are analysis evaluation and construction as suggested by NFPA?   (6)

8. Draw the balanced scheme of a Zener barrier protection system and explain its operation.   (6)

9. Explain PAM, PDM, PPM and PCM with example.   (6)

10. What is the importance of modulation in telemetry? Briefly describe the methods of modulation in digital data.   (6)

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