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Question Paper Code: 45055

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fifth Semester

Electronics and Instrumentation Engineering

14UEI505 - ANALYTICAL INSTRUMENTS

(Common to Instrumentation and Control Engineering)

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Global rod is the source of _____ spectrometer.
 - (a) Infrared spectrometer
 - (b) Mass spectrometer
 - (c) UV-visible spectrometer
 - (d) Atomic absorption spectrometer
2. The UV/VIS spectroscopy
 - (a) Generates colored spectrums
 - (b) Can determine the concentration
 - (c) Can be used to make light visible
 - (d) All the above
3. HPLC stands for
 - (a) High Pulse Liquid Chromatography
 - (b) High Priority Liquid Chromatography
 - (c) Highly Placed Liquid Chromatography
 - (d) High Pressure Liquid Chromatography
4. _____ is the substance that carries the analyte.
 - (a) Solute
 - (b) Eluent
 - (c) Eluate
 - (d) Solvent

5. Which gas has high thermal conductivity?
- (a) Nitrogen (b) Hydrogen
(c) Helium (d) Carbon dioxide
6. In which of the following method the Nitrogen oxides are analyzed based upon the reaction of the matter with the ozone.
- (a) Phosphorescence (b) Chemiluminescence
(c) Fluorescence (d) Electro chemical method
7. In a sodium analyzer, ammonia buffer is used
- (a) To liberate bound Na ions (b) for cleaning the electrode
(c) For concentration measurement (d) for pH adjustment
8. The sodium sensor develops a potential proportional to the _____ of the sodium concentration.
- (a) Square (b) Square root (c) Inverse (d) Log
9. Which one measures the mass-to-charge ratio of ions to identify and quantify molecules in simple and complex mixtures?
- (a) GM Counter (b) SEM
(c) TEM (d) Mass spectrometer
10. Scintillators are chemicals used to convert
- (a) Chemical energy to radiant energy (b) Radiant energy to light
(c) Radiant energy to chemical energy (d) Light to radiant energy

PART - B (5 x 2 = 10 Marks)

11. What are the sources used in UV spectrometers?
12. What is the principle of gas chromatography?.
13. State the principle of working of an infra-red gas analyzer.
14. Define pH and classify its values.
15. What is the basic principle of mass spectrometers.

PART - C (5 x 16 = 80 Marks)

16. (a) Elaborate in detail about the working principle of flame emission photometer with neat diagram. (16)

Or

(b) Explain the constructional details of flame photometer with a neat block diagram. (16)

17. (a) (i) Brief about the working principle of flame ionization detector. (8)

(ii) Illustrate the operating principle of thermionic emission detectors. (8)

Or

(b) Explain with a neat sketch, the different types and basic parts of a liquid chromatography. (16)

18. (a) List out the various methods for dust and smoke measurement. Discuss any two methods in detail. (16)

Or

(b) List out the various methods for dust and smoke measurement. Discuss any two methods in detail. (16)

19. (a) (i) Briefly explain about the principle of dissolved oxygen analyzer. (8)

(ii) How will you use the sodium analyzer? Explain with its neat diagram. (8)

Or

(b) Describe the working principle of pH measurement with neat diagram and briefly discuss the need of using a primary reference electrode. (16)

20. (a) Explain about the different nuclear magnetic resonance spectrometers with appropriate diagrams. (16)

Or

(b) With a neat block diagram, describe about the functioning of a nuclear magnetic resonance spectrometer. (16)

