# University of Mumbai
# Examination 2020- Inter Cluster

Program: BE Instrumentation Engineering

Curriculum Scheme: Revised 2016

Examination: Second Year Semester IV

Course Code and Course Name: ISC404 and Analytical Instrumentation

Time: 1hour Max. Marks: 50

==========

==========

Note to the students:- All Questions are compulsory and carry equal marks .

| | |
|---|---|
| Q1. | Spectroscopy deals with interaction of electromagnetic radiation with matter. What is the speed of this radiation in vacuum in m/s? |
| Option A: | $6 \times 10^8$ |
| Option B: | $5 \times 10^8$ |
| Option C: | $7 \times 10^8$ |
| Option D: | $3 \times 10^8$ |
| | |
| Q2. | Which type of Quantum Transition takes place in Ultra Violet and Visible spectroscopy? |
| Option A: | Rotation of molecules |
| Option B: | Nuclear |
| Option C: | Bonding electrons |
| Option D: | Spin of nuclei in magnetic field |
| | |
| Q3. | Which of the following is not a property or parameter of electromagnetic radiation? |
| Option A: | Wavelength |
| Option B: | Voltage |
| Option C: | Wave number |
| Option D: | Amplitude |
| | |
| Q4. | Which of the following is not a type of Spectroscopy? |
| Option A: | Gamma ray |

| | |
|---|---|
| Option B: | X ray |
| Option C: | Nuclear magnetic resonance |
| Option D: | Sound |
| | |
| Q5. | Which of the following is false about wavelengths of electromagnetic radiation? |
| Option A: | Radiation with short wavelengths have high energies |
| Option B: | Energy does not depend on wavelength |
| Option C: | Radiation with long wavelengths have low energies |
| Option D: | Energy depends on wavelength |
| | |
| Q6. | Which of the following detectors does not require a battery and is also known as barrier layer cell? |
| Option A: | Photomultiplier tube |
| Option B: | Photovoltaic cell |
| Option C: | Photoemissive tubes |
| Option D: | Photo reflector |
| | |
| Q7. | Which of the following detectors is used to detect light intensities which are very weak? |
| Option A: | Photomultiplier tube |
| Option B: | Photovoltaic cell |
| Option C: | Photoemissive tubes |
| Option D: | Photo reflector |
| | |
| Q8. | How does continuous wedge filter differ from normal interference filter used in absorption spectroscopy? |
| Option A: | It permits continuous selection of different wavelength |
| Option B: | It allows narrow band of wavelengths to pass |
| Option C: | It has two semi-transparent layers of silver |
| Option D: | Space layer is made of a substance having low refractive index |
| | |
| Q9. | Which of the following statements is false about single beam absorption instruments? |
| Option A: | Tungsten bulb is used as source |

| | |
|---|---|
| Option B: | Beamsplitter is used to get parallel beam |
| Option C: | Test tube is used as sample holder |
| Option D: | Photovoltaic cell as detector |
| | |
| Q10. | Which of the following statement is false about double beam absorption instruments? |
| Option A: | It is similar to single beam instruments except two beams are present |
| Option B: | Tungsten bulb is used as source |
| Option C: | Reference beam must have higher intensity than sample beam |
| Option D: | Both the beams after they pass through respective samples are compared |
| | |
| Q11. | Which of the following is not an application of colorimeter? |
| Option A: | Paints |
| Option B: | Inks |
| Option C: | Cosmetics |
| Option D: | Composition detection |
| | |
| Q12. | In photometers, the readings of the specimen are initially obtained in the form of which of the following parameters? |
| Option A: | Transmittance |
| Option B: | Absorption |
| Option C: | Wavelengths |
| Option D: | Volume |
| | |
| Q13. | Which of the following is the purpose of balance indicator in double beam photometer or colorimeter? |
| Option A: | Selects particular wavelength |
| Option B: | Splits the wavelength selected into two equal beams |
| Option C: | Detects and indicates the amount of light falling on it |
| Option D: | Indicates the difference between the output of two photometers |
| | |
| Q14. | Which of the following is not true about Fourier Transform Infrared (FTIR) spectrometer? |

| | |
|---|---|
| Option A: | It is of non-dispersive type |
| Option B: | It is useful where repetitive analysis is required |
| Option C: | Size has been reduced over the years |
| Option D: | Size has increased over the years |
| | |
| Q15. | Only pyroelectric transducer or pyroelectric crystals are used as detectors in Fourier Transform Infrared Spectrophotometer (FTIR). What is the main reason for other types of thermal detectors are not being used in FTIR spectrophotometer? |
| Option A: | Less accuracy |
| Option B: | Slower response |
| Option C: | Less precision |
| Option D: | Less sensitivity |
| | |
| Q16. | Chromatography is a physical method that is used to separate and analyse _____ |
| Option A: | Simple mixtures |
| Option B: | Complex mixtures |
| Option C: | Viscous mixtures |
| Option D: | Metals |
| | |
| Q17. | In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure? |
| Option A: | Column chromatography |
| Option B: | Planar chromatography |
| Option C: | Liquid chromatography |
| Option D: | Gas chromatography |
| | |
| Q18. | In chromatography, the stationary phase can be _____ supported on a solid. |
| Option A: | Solid or liquid |
| Option B: | Liquid or gas |
| Option C: | Solid only |
| Option D: | Liquid only |
| | |
| Q19. | In chromatography, which of the following can the mobile phase be made of? |
| Option A: | Solid or liquid |

| | |
|---|---|
| Option B: | Liquid or gas |
| Option C: | Gas only |
| Option D: | Liquid only |
| | |
| Q20. | Nitrogen oxide cannot be directly analyzed using UV and Visible analyzers due to which of the following reasons? |
| Option A: | Less accuracy |
| Option B: | Very low range |
| Option C: | It leads to contamination of the sample |
| Option D: | It is transparent in UV visible regions |
| | |
| Q21. | How is NO converted to $NO_2$ for analysis in UV and Visible analyzers? |
| Option A: | Treating sample gas with pressurized oxygen |
| Option B: | Treating sample gas with ozone |
| Option C: | Treating sample gas with oxygen at low pressure |
| Option D: | Treating sample gas with water at high pressure |
| | |
| Q22. | Which of the following is the full scale range of Infrared spectroscopy method used for measurement of carbon monoxide? |
| Option A: | 0-2 ppm |
| Option B: | 0-500 ppm |
| Option C: | 0-1 ppm |
| Option D: | 0-50 ppm |
| | |
| Q23. | Which of the following is the full scale range of Gas chromatography method used for measurement of carbon monoxide? |
| Option A: | 0-200 ppm |
| Option B: | 0-500 ppm |
| Option C: | 0-1 ppm |
| Option D: | 0-50 ppm |
| | |
| Q24. | Mass spectrometers are used to determine which of the following? |
| Option A: | Composition in sample |
| Option B: | Concentration of elements in sample |
| Option C: | Relative mass of atoms |
| Option D: | Properties of sample |
| | |

| | |
|---|---|
| Q25. | Mass spectrometer separates ions on the basis of which of the following? |
| Option A: | Mass |
| Option B: | Charge |
| Option C: | Molecular weight |
| Option D: | Mass to charge ratio |