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Seat No.: _____

No. of Printed Pages: 2

SARDAR PATEL UNIVERSITY
B. Sc. (Genetics) – Fifth Semester Examination (CBCS)
Monday, 11th November 2019
10:00 a.m. to 1:00 p.m.

US05CGEN01: Instrumental Methods of Analysis

Total Marks: 70

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

Q. 1 Choose the most appropriate answer from the four alternatives given: [10]

- i. _____ has greater wavelength than that of visible light.
(a) Infrared rays (b) Ultra violet rays (c) X rays (d) Beta rays
- ii. The structure that connects ocular with objectives in a microscope is called _____.
(a) Base (b) Stage (c) Body tube (d) Nose piece
- iii. Live, unstained specimens and organisms can be observed best using _____.
(a) Fluorescence Microscope (b) Phase Contrast Microscope
(c) Scanning Electron Microscope (d) Transmission Electron Microscope
- iv. _____ is obtained by multiplying centrifugal field with gravitational factor.
(a) Sedimentation velocity (b) RPM (c) Sedimentation Coefficient (d) RCF
- v. Beer Lambert's law gives the relation between which of the following?
(a) Reflected radiation and concentration (b) Scattered radiation and concentration
(c) Energy absorption and concentration (d) Energy absorption and reflected radiation
- vi. All chromatography techniques basically has _____ phase/ phases.
(a) One (b) Two (c) Three (d) Four
- vii. In reversed phase HPLC, there is a _____.
(a) Polar solvent/ nonpolar column (b) Nonpolar solvent/ Polar column
(c) Nonpolar solvent/ nonpolar column (d) Any of the above
- viii. Colum chromatography separates molecules according to their _____.
(a) Density (b) Matrix (c) Polarity (d) Solubility
- ix. Electrophoresis was developed by _____.
(a) Sanger (b) Tiselius (c) Tsvedberg (d) Tswett
- x. Which of the following moves faster during agarose gel electrophoresis?
(a) Double stranded DNA (b) Nicked circular DNA
(c) Single stranded DNA (d) Supercoiled circular DNA

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(PTO)

- Q.2** Answer any TEN from the following: [20]
- i. Define the terms: Wave length and frequency.
 - ii. What types of lens used in electron microscope?
 - iii. Define the terms resolution and resolving power of microscope.
 - iv. Differentiate between isopycnic centrifugation and rate zonal centrifugation.
 - v. Write difference between “G” and “g” in terms of centrifugation.
 - vi. Give an overview of electromagnetic radiations.
 - vii. Define the term partition coefficient.
 - viii. How separation occurs in ion exchange chromatography?
 - ix. Writes any 4 detectors used in gas liquid chromatography (GLC).
 - x. Why agarose plug are used in PFGE?
 - xi. What are ampholytes? Writes their importance in isoelectric focusing.
 - xii. Give important features of capillary electrophoresis.

- Q.3** (a) Explain principle and working of fluorescence microscope. [5]
(b) Write short notes on: (i) Polarization (ii) Refraction [5]

OR

- Q.3** (a) Describe steps for tissue processing in electron microscope. [6]
(b) Differentiate between compound microscope and electron microscope. [4]

- Q.4** Describe the types, importance and applications of different types of rotors. [10]

OR

- Q.4** Explain principle and working of colorimeter. Write major differences between Ultraviolet and visible spectrophotometers. [10]

- Q.5** Write notes on : (a) Ion exchange chromatography (b) TLC [5+5]

OR

- Q.5** Explain : (a) HPLC (b) Size exclusion chromatography [5+5]

- Q.6** (a) Explain Role of stacking and separating gel in polyacrylamide gel electrophoresis. [5]
(b) Write short note on Isoelectric focusing. [5]

OR

- Q.6** (a) Write a note on buffers for agarose gel electrophoresis. [4]
(b) Describe Pulse field gel electrophoresis. [6]