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SARDAR PATEL UNIVERSITY
B.Sc.(5th Semester) EXAMINATION 2013
Friday, November 15th, 2013
10:30 p.m. TO 1:30 p.m.
SUBJECT: MICROBIOLOGY US05CMIC02
(Bioinstrumentation)

TOTAL MARKS: 70

Note: (1) All the questions are compulsory.
(2) Figures on the right indicate marks.

Q-1 Select the correct answer for each question from the option given below [10]

1. Which basic principle is involved in the IR spectroscopy?
(A)Boil's law (B) Boltzman distribution (C) Bond vibration (D) Child's law
2. In which of the following spectroscopic technique cathode cup is used to emit the radiation of resonance λ ?
(A)Flame Photometry (B) UV-Visible spectroscopy
(C) Nephelometry (D) Atomic Absorption Spectroscopy
3. Which of the following is a role of TEMED in PAGE?
(A)Initiator (B) Crosslinker (C) Monomer (D) Catalyst
4. By which of the following centrifugation technique lysosomes, mitochondria and peroxisomes can be separated?
(A)Rate zonal (B) Isopycnic (C) Centrifugal filter (D) Tubular bowl centrifuge
5. When the use of cationic exchanger is recommended in ion exchange chromatography for the separation of proteins?
(A)pH=pI (B) pH<pI (C) pH>pI (D) Not affected by pH and pI at all
6. The ratio of concentration of analyte between stationary phase and mobile phase is known as _____.
(A)Retardation factor (B) Capacity factor
(C) Partition coefficient (D) Sedimentation coefficient
7. Which of the following is an example of homology and similarity tool?
(A)PROSPECT (B) EMBOSS (C) RAMSOL (D) BLAST
8. _____ are extremely unstable and has transient existence.
(A)Positrons (B) Negatrons (C)Electrons (D)Neutrons
9. Which technique separates protein on the basis of difference in their pI?
(A)PAGE (B) SDS PAGE (C) Agarose gel electrophoresis (D) IEF
10. Which chromatography technique can be used for the separation of nonpolar and volatile compounds?
(A)Gas-liquid (B) Ion exchange (C) Gel Permeation (D) Affinity

Q-2 Give Short answers to following questions (Any ten) [20]

- [1] Give at least two differences between filters and monochromaters
- [2] Draw neat and labeled diagram of different components of MALDI-TOF.
- [3] Draw labeled diagram of premixed burner and explain its mechanism.
- [4] Discuss the role of ammonium persulphate and Bisacrylamide in SDS PAGE.
- [5] Write about nephelometry in brief.
- [6] Enlist applications of Analytical ultracentrifugation.
- [7] What do you mean by on-plate and off-plate detection in Thin Layer Chromatography?
- [8] What is spacer arm? What is its role in affinity chromatography?
- [9] Enlist different types of detectors used in Gas Liquid Chromatography? Discuss about Electron capture detector.
- [10] Define bioinformatics and enlist major data bases in bioinformatics.
- [11] Define isobar and isotopes.
- [12] Enlist general features of biosensors.

Q-3 (A) Draw neat and labeled diagram of different components of Flame photometer and discuss its principle and applications. [05]

(B) Discuss principle and applications of Infra red spectroscopy. [05]

OR

Q-3 Discuss with suitable diagrams-Principle, instrumentation, working and applications of Atomic Absorption spectroscopy. [10]

Q-4 (A) Write a note on- Separation of proteins by SDS PAGE [05]

(B) Justify the dependence of Relative Centrifugal Force (RCF) on applied centrifugal force, gravitational force, angular velocity and distance of the particle from the central axis. [05]

OR

Q-4 Discuss different methods of density gradient centrifugation with its applications. [10]

Q-5 Draw neat and labeled diagram of HPLC system and discuss its principle, working and applications. [10]

OR

Q-5 Discuss in detail about principle, working and applications of ion-exchange chromatography. [10]

Q-6 (A) Discuss the safety measures of handling radioactive isotopes in laboratory? [05]

(B) Discuss the scope of bioinformatics. [05]

OR

Q-6 Define biosensor and giving one example each explain different types of biosensor [10]
