SSR DEGREE COLLEGE (AUTONOMOUS)

Bio-statistics &Laboratory Practices, Biophysical Techniques

SEM -II

Internal Question Bank-II

I. MULTIPLE CHOICE QUESTIONS

1. In which experimental design is each treatment randomly assigned to experimental units without restriction?

a) Randomized Complete Block Design b) Completely Randomized Design c) Latin Square Design d) Factorial Design [ ]

2. The principle of "local control" is used to reduce experimental error in which design?

a) CRD b) RCBD c) LSD d) Both b &c [ ]

3. A Latin Square Design for 4 treatments will have how many experimental units?

a) 4 b) 8 c) 16 d) 12 [ ]

4. When the effect of one factor depends on the level of another factor, it is called?

a) Replication b) Randomization c) Interaction d) Confounding [ ]

5. Confounding is a technique used in which type of experiment?

a) Simple experiments b) Factorial experiments c) CRD d) RCBD [ ]

6. LIMS stands for

a) Laboratory Internal Management System b) Laboratory Information Management System c) Legal Information Management System d) Lab Inventory Management Software [ ]

7. Which of the following is NOT a component of Good Laboratory Practices?

a) Standard Operating Procedures b) Quality Assurance Unit c) Profit maximization d) Record keeping [ ]

8. Laboratory accreditation in India is given by which body?

a) NABL b) GEAC c) RCGM d) DBT [ ]

9. Which type of fire extinguisher is used for electrical fires in the lab?

a) Water b) Foam c) CO_2 d) Sand [ ]

10. Biohazard waste that is infectious should be discarded in which color-coded bin?

a) Red b) Yellow c) Blue d) Black [ ]

11. GEAC stands for

a) Genetic Engineering Approval Committee b) General Environmental Assessment Council c) Gene Editing Advisory Committee d) Genetic Evaluation and Approval Council [ ]

12. The Cartagena Protocol is related to?

a) Chemical safety b) Biosafety of LMOs/GMOs c) Radiation safety d) Clinical trials [ ]

13. Which centrifugation method separates particles based on size and density?

a) Differential centrifugation b) Density gradient centrifugation c) Isopycnic centrifugation d) Ultracentrifugation [ ]

14. SDS-PAGE separates proteins based on?

a) Charge only b) Size only c) Shape only d) Isoelectric point [ ]

15. Agarose gel electrophoresis is mainly used for separating?

a) Proteins b) DNA/RNA c) Lipids d) Carbohydrates [ ]

16. Isoelectric focusing separates proteins based on their?

a) Molecular weight b) Net charge at different pH c) Hydrophobicity d) Amino acid sequence [ ]

17. Beer-Lambert Law is the principle behind

a) Centrifugation b) Electrophoresis c) Colorimetry/Spectroscopy d) X-ray crystallography [ ]

18. FRET technique is used to study

a) Protein folding b) Molecular interactions/distance c) DNA sequencing d) Cell counting [ ]

19. X-ray Crystallography is used to determine

a) Molecular weight b) 3D structure of molecules c) Elemental composition d) Radioactivity [ ]

20. Which radioisotope is commonly used for DNA labeling in Autoradiography

a) ^{14}C b) ^{3}H c) ^{32}P d) ^{35}S [ ]

II. FILL IN THE BLANKS*

1. The three basic principles of experimental design are replication, randomization, and *_____*.

2. In RCBD, blocking is done to reduce *_____* variation.

3. A 3x3 Latin Square Design has *_* rows and _____ columns.

4. In a 2^3 factorial experiment, the number of treatment combinations is *_____

5. GLP stands for Good *_____* Practices.

6. GMP ensures that products are consistently produced and controlled to *_____* standards.

7. The national accreditation body for testing labs in India is _____.

8. MSDS stands for Material Safety *_____* Sheet.

9. Chemical spills of acids are neutralized using *_____*.

10. Yellow bins in labs are used for disposing of *_____* waste.

11. RCGM stands for Review Committee on Genetic *_____*.

12. The Cartagena Protocol on Biosafety was adopted in the year *_____*.

13. LMOs stands for Living *_____* Organisms.

14. Ultracentrifuges can generate speeds up to *_____@* rpm.

15. In density gradient centrifugation, *_____* is commonly used to create the gradient.

16. The matrix used in SDS-PAGE is *_____*.

17. 2-D gel electrophoresis combines IEF and *_____*.

18. FTIR spectroscopy measures the *_____* of molecules.

19. NMR spectroscopy is based on the magnetic properties of *_____* nuclei.

20. A scintillation counter is used to measure *_____* emitted by radioisotopes

III. SHORT ANSWER QUESTIONS*

1. *Define Completely Randomized Design (CRD)*. Explain its advantages and disadvantages with one example.

2. *What is the difference between Good Laboratory Practices (GLP) and Good Manufacturing Practices (GMP)?* Mention two key components of each.

3. *Explain the role of GEAC in India*. How is it different from RCGM?

4. *Describe the principle and application of Density Gradient Centrifugation*. How does it differ from Differential Centrifugation?

5. *What is the principle of FRET?* Mention two applications of FRET in biotechnology research.