4/11/19 M

[This question paper contains 7 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **7866** **J**

Unique Paper Code : 32167501

Name of the Course : **B.Sc.(Hons.) Botany : DSE - 1**

Name of the Paper : Analytical Techniques in Plant Sciences

Semester : V

Time : 3 Hours ***Maximum Marks : 75***

Instructions for candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Question **NO.1** is compulsory.

(b) Attempt **five** questions in all, including Question **No. 1**.

(d) Attempt all parts of the question together.

1. (a) Name a marker enzyme for the following organelles (any **five**) : 1×5=5

(i) Lysosomes

P.T.O.

(ii) Mitochondria

(iii) Chloroplast

(iv) Golgi Apparatus

(v) Endoplasmic Reticulum

(vi) Nucleus

(b) Fill in the blanks (any **five**) : 1×5=5

(i) Sedimentation rate of a particle at a specific RCF depends on its ..... and ..... .

(ii) Stepwise isolation of sub-cellular particles during successive centrifugation is called ..... .

(iii) ..... is a specialized kind of chromatography performed under high pressure for better resolution of components.

(iv) ..... is the technique used for determining the age of fossils.

(v) Radioisotopes have neutron : proton ratio greater than ..... .

(vi) ..... is the ability to distinguish two close objects as distinct.

(c) Explain the function/use of the following (any **five**) : 1×5=5

(i) Deuterium Lamp

(ii) Osmium Tetroxide

(iii) Lead Sheild

(iv) Electron Gun

(v) Probe

(vi) SDS

2. (a) Explain the working of spectrophotometer with reference to the Beer- Lambert law. What are the applications of UV and visible spectrophotometer ? 9

(b) Discuss the technique of autoradiography. List **five** radioisotopes that can be used to study biomolecules/ biological processes. 6

3. (a) What is Blotting ? Explain the technique of Western/ Southern Blotting in detail. 10

(b) What are the measures of central tendency ? Discuss briefly Arithematic Mean, Median and Mode. 5

4. (a) Write an account of chromosome banding technique. Mention the application of this technique. 8

(b) Using a ray diagram explain the working of a confocal microscope. 7

5. Differentiate between (any **three**) : 5×3=15

(a) Paper chromatography and thin layer chromatography

(b) Positive staining and negative staining

(c) AGE and PAGE

(d) SEM and TEM

(e) HPLC and GLC

6. Explain why (any **five**) : 3×5=15

(a) Column of electron microscope is placed under vacuum.

(b) TEMED and APS should be added just before casting of gel.

(c) Salts of heavy metals are used as stain in electron microscopy.

(d) Resolution of electron microscopy is higher than light microscope.

(e) Acrylamide gel are used for DNA Sequencing.

(f) Small amount of bisacrylamide is added in acrylamide for Polyacrylamide gel polymerization.

(g) Glycerol and bromophenol blue is added to the DNA while loading it onto the gel.

7. Attempt (any **three**) : 5×3=15

(a) In garden pea, Smooth seeds are (R) is dominant to wrinkled seeds (r). In a cross between a plant homozygous for smooth seeds and winkled seeds, the following progeny was obtained in F2 generation

Smooth seeds 5474

Wrinkled seeds 1850

Perform chi-square analysis to see if the data fits into the expected results of the cross.

(b) With the help of diagram explain affinity chromatography.

(c) Briefly explain the pulse chase experiment used in biological research.

(d) Write a short note on X-ray Crystallography.