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SEAT No. _____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
M.Sc. (II Semester- CBCS) Examination
Subject: Botany
PS02EBOT21 : Microtechniques
Tuesday, March 26 , 2019
Time: 10.00 a.m. to 1.00 p.m.

Total Marks: 70

Q1. Choose the correct answer:

(8x1=8)

- i) The refractive index of immersion oil is
(a) 1 (b) .75 (c) 1.51 (d) none
- ii) Which of the following has high depth of focus
(a) SEM (b) TRM
(c) HVTEM (d) none
- iii) Following are all the components of electron microscope except
(a) electromagnetic lens (b) vacuum pump
(c) Electron gun (d) rotating stage
- iv) The kind of electron microscope which is used to study internal structure of cell is
(a) Scanning electron microscope
(b) Transmission electron microscope
(c) Scanning transmission electron microscope
(d) Both b and c
- v) Which solvent can be used as both for killing and dehydrating the biological material
(a) Ethyl alcohol (c) xylene
(b) Butyl alcohol (d) Methyl alcohol
- vi) The most common stains applied for histological study of plant tissues are
(a) Safranin and caramine (b) Safranin and fast green
(c) Toluidine blue O and safranin (d) Fast green and Haematoxylin
- vii) β -glycerophosphate is used as a substrate for the localization of:
a) peroxidase b) lipase
c) succinic dehydrogenase d) acid phosphatase
- viii) In TEM studies PATAg staining is employed for demonstration of:
a) proteins b) lipids c) polysaccharides d) nucleic acids

(1)

(P.T.O)

Q2. Answer any SEVEN of the following in brief:

(7x2=14)

- (a) Define: 'Conjugate foci'.
- (b) Define: lens?
- (c) Differentiate: Polarizer and analyzer?
- (d) Why tungsten is preferred as a source of electron in a thermionic electron gun? Explain.
- (e) A chemical should satisfy which conditions to be used as a fixative?
- (f) Differentiate between Direct and indirect staining.
- (g) What is the role of buffers in EM fixatives?
- (h) How does formavar film help during observation of ultrathin sections?
- (i) How do hydrolytic enzymes differ from oxidative enzymes?

Q3. (a) Write a note on types of objectives.

(6)

(b) What are the advantages and disadvantages of dark field microscope over a bright field microscope?

(6)

OR

(b) Define: relief contrast. Explain how it is achieved in a differential interference contrast microscope.

(6)

Q4 (a) Explain the image formation in TEM and SEM.

(6)

(b) Field emission guns are better than thermionic: Justify

(6)

OR

(b) Briefly explain the construction of an electromagnetic lens.

(6)

Q5 (a) What is mechanical fixation? Why this method is considered superior over conventional methods of fixation? Write the importance of fixatives.

(6)

(b) What is microtomy? Write a note on microtomes and their use in preparing various biological samples.

(6)

OR

(b) Write note on histo-chemical localization in biological samples and its importance

(6)

Q6 (a) Briefly explain the sequential steps followed and chemicals used in the preparation of biological samples for TEM studies.

(6)

(b) What is freeze-fracturing? How does this help in the study of biological samples?

(6)

OR

(b) What are the artifacts commonly encountered while observing biological samples under TEM?

(6)

.x.x.x.x.

(2)