M.Sc. ZOOLOGY
First Semester (Repeat)
BIO-INSTRUMENTATION & CELL BIOLOGY
(MSZ - 102)

Duration: 3Hrs. **Full Marks: 70**

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

Answer any *four* from *Question no.* 2 to 8
***Question no.* 1 is compulsory.**

1. Write a note on Cross-linking fixative. Discuss the different factors affecting fixation process. (4+6=10)
2. Describe the working principle of Gas-Liquid Chromatography. Discuss the applications of High Pressure Liquid Chromatography. (5+5=10)
3. Write short notes on *any two* of the following: (2×5=10)
   a) Organisation of intermediate filament.
   b) Kinesin and dynein.
   c) ELISA.
   d) Cell signalling classification.
4. What is immunoflouresence technique? Differentiate between direct and indirect immunoflouresence. Mention two of its applications. (4+6=10)
5. Distinguish between PAGE and Agarose gel electrophoresis. State the mechanism of a separation of protein in a given gel. (4+6=10)
6. Define radioactive isotope. State how is the autoradiography useful in identifying various biological molecules. (3+7=10)

7. Describe how membrane carbohydrates present in human RBC plasma membrane play a crucial role in determining blood group. Discuss briefly the properties of three classes of membrane protein and how they vary among themselves. (5+5=10)
8. Describe in details the moleculer events that take place in mitosis cell division. How is metaphase I different from metaphase II of meiosis cell division? (5+5=10)

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REV-00
MSZ/04/10

2017/08

M.Sc. ZOOLOGY
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Duration: 20 minutes **Marks – 20**

(PART A - Objective Type)

I. Choose the correct answer: **1×20=20**

1. Lipid anchored proteins are bound to membrane by a complex oligosaccharides linked to a molecule of:
   a) Phophatidylcholine b) Phosphatidylinositol
   c) Phosphatidylserine d) Phosphatidic acid

2. Which of the following is not used for detection in GLC?
   a) Infrared Spectroscopy b) NMR
   c) Flame ionization d) Electrical Conductivity

3. In which stage of the cell cycle, DNA synthesis takes place?
   a) G1 b) G2 c) S d) M

4. In a given thermal cycler the temperature gradient is arranged as:
   a) 72^0c 94^0c 50^0c b) 94^0c 72^0c 50^0c
   c) 50^0c 94^0c 72^0c d) 94^0c 50^0c 72^0c

5. The eluent strength is a measure of:
   a) Solvent adsorption energy b) Solvent absorption energy
   c) Solvent diffusivity d) Solvent mixing index

6. Which of the following technique is used to quantify antigens on gels?
   a) Flow cytometry b) Mancini method
   c) ELISA d) Immunoelectrophoresis

7. Which of the following is a metachromatic stain?
   a) Janus green- B b) Fuchsine
   c) Azure B d) Toluidine blue

8. The_____ surrounds the cell like a belt, preventing the passage of substance between the cells.
   a) Gap junction b) Desmosomes
   c) Hemi desmosomes d) Tight junctions

9. Post mitotic phase is:
   a) G_0 phase b) G_1 phase c) S-phase d) G_2 phase

10. Which type of microscope is best to study the topography of a specimen?
    a) SEM b) Confocal
    c) Phase-contrast d) Fluorescence

11. In which stage of prophase I, crossing over takes place?
    a) Leptotene b) Pachytene
    c) Diplotene d) Zygotene

12. All the following are thermostable polymerases except:
    a) Taq polymerase b) Vent polymerase
    c) DNA polymerase d) Pfu polymerase

13. Progression to anaphase is mediated by activation of:
    a) Anaphase Promoting Complex b) Mad/Bub complex
    c) Cyclin-cdk complex d) Condensin and cohesion

14. In the Southern blotting technique the DNA molecules could be separated due to:
    a) Their molecular weight b) Capillary phenomenon
    c) Optimal buffer concentration d) Nitrocellulose filter paper

15. A crossed precipitation line following double diffusion technique is due to:
    a) Shared epitopes between antigens.
    b) Identity between antigens.
    c) No common epitopes between antigens.
    d) Few common epitopes between antigens.

16. The transmittance of light is:
    a) Directly proportional to absorption light.
    b) Inversely proportional to absorption light.
    c) Directly proportional to that of the monochromatic light.
    d) Inversely proportional to that of the monochromatic light.

17. Which of the following statements are true in case of fluid-mosaic model for cell membranes?
    P. Between 5-8 nm thick and appear trilaminar when viewed in cross section under electron microscope.
    Q. Less than 1 nm thick and consist of a layer of protein sandwiched between two layers of phospholipids.
    R. In the lipid bilayer, proteins are embedded at irregular intervals and held by hydrophilic interactions between lipids and hydrophilic domains of proteins.
    S. The protein domains exposed on one side of the lipid bilayer are different from those exposed on the other side.

    a) P,Q b) P,S c) Q,S d) P,R

18. A polar molecule:
    a) Is slightly negative at one end and slightly positive at one end.
    b) Has an extra electron, giving it a negative charge.
    c) Has an extra neutron, making it weight more.
    d) Has covalent bond.

19. Identify the correct set of three statements for cytoskeletal protein filaments from the following list.
P. microfilament is about 8 nm wide
Q. microfilament is about 25 nm wide
R. intermediate filaments have size intermediate between microfilament and microtubules
S. protofilaments of microtubules are composed of alpha/beta tubulin heterodimer
T. colchicine binds to the tubulin subunits in the spindle microtubule causing disassembly to free units
a) R,S,T b) Q,R,S c) P,R,S d) P,Q,R

20. A feature common to all transmembrane protein is
a) A phosphorylated exterior domain.
b) A structure consisting almost exclusively beta-sheet.
c) An amino acid sequence rich in acidic residues.
d) An alpha-helical region of about 20 to 25 hydrophobic amino acids.

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University of Science and Technology, Meghalaya

Date Stamp:_____

SESSION 2016-17
COURSE_____PAPER CODE:_____
NAME OF THE PAPER:_____
SEMESTER_____

Instructions to Candidates

1. This answer booklet has 4 pages. Please check before writing whether it is complete or in good condition.
2. Do not write your name anywhere in the answer booklet.
3. Write legibly on both sides of the paper
4. You may use some space for any rough notes or calculation on the answer booklet if you need. These rough notes, calculations must be scored out before submitting the answer booklet.
5. Do not bring any book or loose paper in the examination hall.
6. Do not tear any page from the answer booklet.
7. Do not write anything on the question paper or blotting paper or any pieces of paper while you are in the examination hall.
8. Any act of indiscipline or misbehavior in the examination hall will result in your expulsion.
9. No examinee is allowed to leave the examination hall until 30 minutes lapse after the commencement of the examination.
10. Additional answer sheet will be supplied after the main answer booklet is completed.

For Objective Type Questions

Page No.	Marks
Total	

For Descriptive Type Questions

Question No.	Marks
Total	
Grand Total	

Session: 2016-17
Course_____
Roll No._____
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