

Fifth semester theory Z 5.1 Cell biology and Developmental biology

CELL BIOLOGY

Code : **Z-5.1**

Contact Hours :54

Credit Points :

Univ Code :

Work load : 3 hours per week

Evaluation: Continuous Internal Assessment - 30 marks
Semester and Examination - 70 marks

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| 1. Introduction to cell biology : | -2hrs |
| > Definition and scope | |
| > Generalised prokaryotic and eukaryotic cell: Size, shape and structure. | |
| 2. Plasma membrane: | -3hrs |
| ^ Unit membrane concept. | |
| > Fluid mosaic model | |
| > Functions of plasma membrane | |
| 3. Endoplasmic reticulum: | -2hrs |
| > Discovery, occurrence and morphology. | |
| > Type : Smooth and Rough. | |
| > Functions. | |
| 4. Golgi complex: | -2hrs |
| > Occurrence and morphology | |
| > Ultra structure and functions. | |
| 5. Lysosomes: | -2hrs |
| > Occurrence and morphology | |
| > Ultra structure and functions. | |
| 6. Mitochondria: | -2hrs |
| > Origin ,occurrence and morphology | |
| > Ultra structure and functions. | |
| 7. Nucleus: | -3hrs |
| > Size , shape , number and position. Structure and functions of pore complex. | |
| > Nucleolus: general organization and functions. | |
| > 8. Cell cycle and cell division: | |
| > Mitosis , meiosis and various phases of cell cycle. | |
| | -5 hrs |
| 9. Cancer Biology: | |
| > Definition and types of cancer | |
| > Characteristics of cancer cell | |
| > Carcinogen : Physical, Chemical and biological carcinogens. | |

References

1. Cell and molecular biology,1988, De Robertis EDP and De Robertis EME, Molt Saunders Inc.
2. Cell biology, 1986,C.B.Powar, Himalaya publication. House
3. Cell biology ,1986,Avers C.J. Addison Wesley Pub. Co. New York & London.
4. Cell and molecular biology ,1996, G. Carp John Waley,USA.
5. Cell biology, 1993, David E. Sadava Johnes and Bartlett publi. London.

Developmental Biology

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| 1. Introduction | -4hrs |
| <ul style="list-style-type: none"> > Branches and Scope of embryology. > Gametogenesis , fertilization types and mechanism. | |
| 2. Cleavage | -3 hrs |
| <ul style="list-style-type: none"> > Planes of cleavage - types of cleavage-holoblastic, meroblastic,radial and spiral types with examples. - Effect of yolk on cleavage. | |
| 3. Early development of frog | -4 hrs |
| <ul style="list-style-type: none"> > Structure of ovum- Cleavage-Blastula-fate maps of Blastula-Gastrulation. | |
| 4. Early development of chick | - 5 hrs |
| <ul style="list-style-type: none"> > Structure of hen's egg. Gastrulation -origin and structure of primitive streak. > Study of structure of 18,24,48 hour chick embryos. (whole mount) | |
| 5. Extra embryonic membranes of chick | -3hrs |
| <ul style="list-style-type: none"> > Development-structure and functions of yolk-sac, amnion, chorion and allantois. | |
| 6. Placenta | -4hrs |
| <ul style="list-style-type: none"> > Yolk sac placenta- Allantoic placenta-structure and functions of placenta.
Morphological and histological, classification of placenta with examples. | |
| 7. Modern trends in reproduction -IVF, Sperm bank, surrogate mother | -3hrs |

SYLLABUS FOR PRACTICAL:ZP-5.1 BASED ON PAPER Z-5.1:CELL AND DEVELOPMENTAL BIOLOGY

a) Cell Biology:

1. Procedure for Preparation of fixative:Formaldehyde (6%), Alcohol (10% to90%),Carnoy's fluid, Bouin's fluid.
2. Procedure for the Preparation of stains: Borax carmine (alcoholic), Eosin (alcoholic), Harri's and iron alum hematoxylene, aceto-carmine, aceto- orcine, Giemsa stain.
- 3.Study of ultrastructure of cell organells (using charts).
4. Observation and study of permanent slides of onion root tip to study all stages of mitosis.
5. Observation of permanent slides of grasshopper testes to study various stages of meiosis.
6. Squash preparation of onion root tip to study stages of mitosis.

b)Developmental Biology

7. Stages of development of frog: The study of cleavage stages, Blastula, Gastrula and Neurula(sections) .
8. .Study of permanent slides of chick embryos: 18hrs, 24hrs,33hrs and 48hrs(whole mounts).
9. .Study of permanent slides of chick embryos: TS of 18hrs and 24hrs.
10. Preparation of chick embryo mount

FORMAT FOR QUESTION PAPER FOR PRACTICAL: ZP-5.1 BASED ON PAPER Z-5.1: CELL AND DEVELOPMENTAL BIOLOGY

Maximum Marks : 40

Q.1.	Explain the Procedure to Prepare the following fixative and stain. 1) 2)	:	2 x 2 = 4
Q.2	Identification of cell organelles (from the charts) (2-cell organelles, 1-mitosis and 1-meiosis)	:	4 x 2 = 8
Q.3	Squash preparation of onion root tip/ grasshopper testis/ flower bud of onion	:	05
Q.4	Identification of embryological slides(1-frog, 1-chick WM, 1-chick TS)	:	06
Q.5	Mounting of Chick embryo	:	07
Q.6	Record Book	:	5

Key Note to the Examiners:

1.If the Embryo is not developed in egg, the Students are asked to identify the given Permanent slide and write Characters with neat labelled diagram.

2.Charts are used for identification of cell organelles