MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SBT 419: CYTOLOGY AND MOLECULAR BIOLOGY

DATE: 22/7/2019 **TIME: 2.00-4.00 PM**

INSTRUCTIONS

1. Anwer Question 1 (**compulsory**) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

QUESTION ONE

a) Differentiate between the following terms:-

i. Chromosome and gene (1.5 marks)

ii. Centromere and teleomere (1.5 marks)

b) Outline the main events in the anaphase stage of mitosis (3 marks)

c) Explain the significance of interphases in cellular division (3 marks)

d) Briefly describe the evidences that the genes are located in the Chromosomes (3 marks)

e) Explain the term tetrad analysis and its importance in inheritance (3 marks)

f) Briefly describe polyploidy and its implications in organisms (3 marks)

g) State three abnormalities that arises from aneuploidy in human beings (3 marks)

h) Distinguish between point and flameshift mutations (3 marks)

i) Define gene recombination and explain its impotance in sexually reproducing organisms (3 marks)

j) Giving an example explain a genetic marker (3 marks)

SECTION B

QUESTION TWO

Discuss the types and causes of gene mutation (20 marks)

QUESTION THREE

Discuss mitotic division (20 marks)

QUESTION FOUR

Describe the types of chromosomal aberations (20 marks)

QUESTION FIVE

Describe the cytogenetic mapping technique of fluorescence in situ hybridization (FISH) and state its applications (20 marks)

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University Examinations for 2017/2018 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

Fourth Year First Semester Examination for Degree in Bachelor of Science in ----------

CODE:SBT 419--- UNIT NAME: Cytology and Molecular Biology

Date---------- Time ----------

Instructions

1 Anwer Question 1 (**compulsory**) and **any two** questions in Section B.
2 Use clean well labelled diagrams wherever appropriate.

SECTION A

Question 1. – Compulsory (30 marks) –

i Differentiate between the following terms:-
  (a).Allele and gene (1.5 marks)
  (b). Centromere and teleomere (1.5 marks)
ii Outline the main events in the prophse stage of mitosis (3 marks)
iii In what aspects does prophase in meiosis differ from that in mitosis (3 marks)
iv Briefly describe the evidences that the genes are located in the Chromosomes (3 marks)
v Distinguish between genetic mapping and Restriction Mapping (3 marks)
vi .Briefly describe the impotance gene recombination in sexually reproducing organisms (3 marks)
vii. Briefly describe polyploidy and its implications in organisms (3 marks)
viii. State three abnormalities that arises from aneuploidy in human beings (3 marks)
ix. Explain flameshift mutation (3 marks)
x. Describe polymophism as a genetic marker in individuals of a population in a given species. (3 marks)

SECTION B

Questions 2

Discuss gene mutation (20 marks)

Question 3
Discuss meiotic division (20 marks)
Question 4
Describe the types of chromosomal aberations (20 marks)
Question5
Describe the cytogenetic mapping techniques of flow cytometry and state its applications (20 marks)

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University Examinations for 2017/2018 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

Third Year First Semester Examination for Degree in Bachelor of -- ---------- in ----------

CODE:SBT 300 UNIT NAME:CELL BIOLOGY AND GENETICS

Date---------- Time ----------

Instructions

1. Anwer Question 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

Question 1. – Compulsory (30 marks) – This question should cut across the entire course content. It should have 10 subsections, each worth a maximum of 3 marks. (objective type questions)

i.	Briefly describe the functions of the following cell organelles:-	
	(a).Golgi apparatus	(1 mark)
	(b). Nucleus	(1 mark)
	(c).vacuole	(1 mark)
ii.	Outline the components of cell cytoskeleton	(3 marks)
iii.	Explain cell fractionation and its importance in cell biology	(3 marks)
iv.	Differentiate between homogenization and sonication	(3 marks)
v.	State three differences between DNA qnd RNA	(3 marks)
vi.	Describe the mendelian laws of genetics	(3 marks)
vii.	Distinguish the following terms as used in genetics:-.	
	(a).Dominant and recessive alleles	(1.5 marks)
	(b)Heterozygous and homozygous individuls	(1.5 marks)
viii.	Describe the role of somatic cell division in living things	(3 marks)
ix.	Explain the process of crossing over and explain why this process play important role in living organisms	(3 marks)
x.	Define evolution and explain its influence in speciation	. (3 marks)

SECTION B

Questions 2
Discuss protein biosynthesis (20 marks)
Questions 3
Dicuss the various cytological techniques in cwll biology (20 marks)
Questions 4
Describe the mechanisms of gene transfer in a baterial cell (20 marks)
Questions 5
Meiosis occurs in two principal phases; describe all the stages through this phase (20 marks)

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University Examinations for 2017/2018 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

Third YearFirst Semester Examination for Degree in Bachelor of --- ---------- in ----------

CODE SBT 300 UNIT NAME: CELL BILOGY AND GENETICS

Date---------- Time ----------

Instructions

1. Anwer Question 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

Question 1. – Compulsory (30 marks) – This question should cut across the entire course content. It should have 10 subsections, each worth a maximum of 3 marks. (objective type questions)

i. Briefly describe the functions of the following cell organelles:-
   (a).Endoplasmic reticulum (1 mark)
   (b). Nucleolus (1 mark)
   (c).Cenrosomes (1 mark)

ii. Explain the role of cell cytoskeleton (3 marks)

iii. Giving examples, explain cell motility (3 marks)

iv. Explain how genotype and phenotype of an organism relate to each other(3 marks)

v. Can a true breeding individual make more than one kind of gametes for a given kind of characteristic. Explain (3 marks)

vi. Briefly describe the following mechanisms of speciation:-
   (a) Geographical isolation (1.5 marks)
   (b) Reproductive isolation (1.5 marks)

vii. The primary sex-determining genes in mammals is on Y chromosome. Explain (3 marks)

viii. Outline the components in nucleic acids (3 marks)

ix. Describe in what aspects the prophase in meiosis differ from prophase in mitosis (3 marks)

x. Briefly describe the processes of cell fractionation (3 marks)

SECTION B

Questions 2
Describe the mechanisms of gene transfer in a baterial cell (20 marks)
Questions 3
With an example discuss sex linkage phenomenon in living organisms (20 marks)
Questions 4
Discuss mitotic cell division (20 marks)
Questions 5
Describe transcription and translation in protein synthesis (20 marks)