Previous year questions (2016-2020)
Department of Zoology
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QUESTION BANK
ZOOLOGY (HONOURS)
5th SEMESTER FIFTH PAPER
ZOO-505: CELL BIOLOGY AND GENETICS

UNIT 1: CELLULAR ORGANISATION

MCQ (1 MARK)

1. Unit membrane concept was proposed by- 2018
   (a) Singer
   (b) Nicolson
   (c) Robertson
   (d) Watson
2. The structure formed where two adjacent membranes are thickened with disc-shaped adhesive material in between and tonofibrils are radiating out from adhesive region is 2019
   (a) plasmodesmata
   (b) Gap junction
   (c) tight junction
   (d) desmosomes
3. The membrane receptor action is the cell recognition and binding of hormone results the formation of hormone receptor complex with the activation of 2020
   a. Phospholipid transferase
   b. ATPase
   c. AMP
   d. adenylate cyclise

VERY SHORT ANSWER QUESTIONS (1 MARK)

1. Prokaryotes are usually anaerobic. What conclusion can be drawn on the evolution of prokaryotes and eukaryotes? 2018
2. How does active transport differ from passive transport? Give one point. 2019
3. The cell membrane consists of fused repeating units and consists of monopartite and multipartite Membranes. Who has given this repeating units concept of cell membrane? 2020

SHORT ANSWER QUESTONS (2/3 MARK)

1. Why the *E.coli* is most studied prokaryotes? Can the viruses grow and multiply outside the living cell? 2016
2. What is active transport? Write down the different types 2020

LONG ANSWER QUESTIONS (12 MARKS)

1. Describe junctional complexes for keeping adjacent cells together. 2016
2. Define active transport and describe the mechanisms for active transport. 2016
3. Compare Prokaryotes and Eukaryotes by giving six points 2017
4. Write the hypothesis of unit membrane as given by Robertson and also write any four properties of Robertson's unit membrane model. 2017

5. What is intercellular adhesion? What are the types of cellular junctions involved interactions of cells? What will be the consequences of failure of cellular adhesion? 2018
6. What is active transportation? Discuss the different types of active transport. How are active transports maintain the cellular metabolism? 2018
7. Describe the structure of a prokaryotic cell with a label diagram. Describe Robertson's unit membrane model 2019
8. a) Write down the difference between Prokaryotes and Eukaryotes by giving five points
   b) What is cell junction? Explain the types of cell junction. 2020

UNIT 2: CYTOPLASMIC ORGANELLES

MCQ 1 MARK

1. Heterophagosome, autophagosome and residual bodies belong to 2016
   (a) secondary lysosomes
   (b) primary lysosomes
   (c) chromosomes
   (d) supernumerary chromosomes
2. Mitochondrial membrane contains a transporter for 2016
   (a) GTP
   (b) ATP
   (c) Acetyl CoA
   (d) NADP
3. Lysosomes are abundant in 2017
   (a) WBCs and osteoblasts
   (b) RBCs and spleen
   (c) liver and spleen
   (d) WBCs and spleen
4. Endoplasmic Reticulum is absent in 2017
   (a) animal cells
   (b) plant cells
   (c) bacterial cell
   (d) sex cell
5. Flagetham of eukaryotic cell shows 2020
   (a) 9-0 arrangement
   (b) 19-2 arrangement
   (c) 10-larrangement
   (d) None of the above

VERY SHORT ANSWER QUESTIONS (1 MARK)

1. Who proposed the fluid mosaic model of plasma membrane? 2016
2. Write the chemical composition of Golgi complex. 2017
3. Write one function of microbodies. 2019
4. What 'S' stands for in ribosome? 2019
5. Differentiate SER from RER . 2019
6. State one point of difference between peroxisomes and glyoxysomes. 2020
7. State one point of difference between 70S ribosome and 80S ribosome 2020

SHORT ANSWER QUESTONS (2/3 MARK)

1. Draw a neat labelled diagram of fluid mosaic model of plasma membrane. 2018

2. Differentiate between cilia and flagella 2020

LONG ANSWER QUESTIONS (5 MARKS)

1. Describe the fluid mosaic model of cell membrane. 2020
2. Explain the origin and functions of lysosomes. 2020

LONG ANSWER QUESTIONS (12 MARKS)

1. State the functions of different components of an animal cell. What are microbodies of an animal cell? 2016
2. When plasma membrane is called a red cell ghost? What are the main components of plasma membrane. Describe the fluid mosaic model of plasma membrane. 2017
3. What are lysosomes? Describe the different types of lysosomes. What will be the consequence if lysosomes are absent in cell? Why do the hydrolytic enzymes could not digest the lysosomal membrane? 2018
4. Describe the structure of mitochondria. Write any two functions. 2019

UNIT 3: NUCLEAR ORGANISATION

MCQ 1 MARK

1. The human karyotype was first made by 2016
   (a) Tjio and Levan of Sweden in 1956
   (b) Nettie Stevens in 1956
   (c) C de Duve in 1955
   (d) Nettie Stevens in 1965
2. Fresh broken chromosome ends are sticky and tend to fase however ends of intact chromosomes are stable. Their stability is due to the presence of 2017
   (a) centromere
   (b) telomeres
   (c) spinal membrane around chromosome
   (d) kinetochores
3. The darkly stained portion of chromatin is 2018
   (a) Constitutive heterochromatin
   (b) nuclear organizer region
   (c) Intercalary chromatin
   (d) facultative heterochromatin
4. Polytene chromosome is generated due to 2019
   (a) Failure of DNA replication
   (b) repeated DNA replication without segregation of chromosome
   (c) pairing of homologous chromosomes
   (d) extensive transcription process

VERY SHORT ANSWER QUESTIONS (1 MARK)

1. Give one point of difference between euchromatin and heterochromatin. 2016
2. How many histone proteins are present in the nucleosome? 2016
3. What are lampbrush chromosomes? 2016
4. Name the molecule which must pass between the nucleus and cytoplasm. 2017
5. What do you call a chromosome having two kinetochores? 2017
6. Waldeyer (1888) discovered some thread like structure in the nucleus. Name the structure. 2019

7. What are supernumerary chromosomes? 2019
8. What is the functional significance of the telomeres of chromosomes? 2020

SHORT ANSWER QUESTONS (3 MARK)

1. Define karyotype. Arrange the chromosomes of a normal human male into a table of 7 groups. 2016
2. Write the principal components of interphase nucleus. Mention any two functions of any one component 2016
3. Write three points of difference between euchromatin and heterochromatin. 2017
4. Draw the ultra-structure of nucleolus. Give two examples of mammalian cells which lack nucleolus 2017
5. What is the size of chromatin? What are the reasons behind the increase of 2 nm of DNA to the size of chromatin? 2018
6. What are nuclear pores? Write the function of nuclear pore. How is transfer of materials always 3 one-way traffic? 2018
7. What is the relationship between nucleolus and nuclear organizer region? 2018
8. Draw the structure of nucleus displaying nucleolus, heterochromatin, euchromatin and interchroma matrix regions 2019
9. Why chromatin is regarded as most important constituent of the nucleus? What is the nature of the chromatin in interphase mucleus? What do you call the non-chromatin region of chromosome? 2019
10. What are the different types of chromosomes according to centromere? 2020
11. Explain the genetic significance of polytene chromosomes. 2020

UNIT 4: CELL REGULATORY MECHANISM

MCQ 1 MARK

1. The full form of lac operon is 2016
   (a) lack operon
   (b) lactic acid operon
   (c) lactose operon
   (d) lactin operon
2. Crucial part of cell cycle is 2018
   a. S phase
   b. G_2phase
   c. metaphase
   d. telophase
3. Each turn of the double helix covers a distance of 34A^{o} and contains 2020
   (a) 15nucleotides per turn
   (b) 10 nucleotides per turn
   (c) 20 nucleotides per turn
   (d) 30 nucleotides per turn
4. Out of 64codons, how many codons code for amino acids? 2020
   (a) 20
   (b) 60
   (c) 61
   (d) 64

VERY SHORT ANSWER QUESTIONS (1 MARK)

1. Write the meaning of one gene-one enzyme concept. 2016

2. What are primers in DNA replication? 2018
3. What is phosphodiester bond? 2020

SHORT ANSWER QUESTONS (2/3 MARK)

1. What is transcription? 2017
2. What are technical difference between the primers of DNA replication and PCR. 2018
3. What is nucleosome? Draw the structure of it. 2020
4. Who discovered genetic code? Why genetic code is said to be degenerate and non-ambiguous? 2020

LONG ANSWER QUESTIONS (10/12 MARKS)

1. Why is meiosis of utmost importance in sexually reproducing organisms? Describe the details of first meiosis with particular emphasis on prophase-1. Write the long form of zDNA and pDNA. 2016
2. Describe the process of DNA replication with the help of a schematic diagram. 2017
3. Describe the Operon concept about the regulation of protein synthesis 2017
4. Describe the main components of mitosis cell division regulation and their checkpoints. 2018
5. Discuss the differences between lac operon and Trp. operon in gene regulation 2018
6. Explain the mechanism of DNA replication 2019
7. What is operon? Describe the Difference between Inducible Operon System and Repressible Operon System with an example of each. 2020
8. Define cell cycle, Explain the different stages of mitotic cell division with diagram. 2020

UNIT 5: GENETICS

MCQ 1 MARK

1. in a car accident, the driver loses his blood to a great extent and he needs blood transfusion immediately without analysing his blood group. The safely transferable blood group is 2016
   (a) O and Rh negative
   (b) O and Rh positive
   (c) AB and Rh negative
   (d) AB and Rh positive

2. Turner syndrome occurs in 2018
   (a) Female
   (b) Male
   (c) Boy
   (d) Foetus

3. Genic balance theory was proposed by 2018
   (a) Bridges
   (b) Morgan
   (c) Boveri
   (d) Lillie

4. ABO locus of human has 3 alleles. The possible genotypes of the four blood groups will be 2018
   (a) 4
   (b) 6

(c) 8
(d) 10

5. Exchange of segments between non-homologous chromosomes is called 2019
   (a) inversion
   (b) duplication
   (c) translocation
   (d) deletion

VERY SHORT ANSWER QUESTIONS (1 MARK)

1. In which blood group agglutination are absent 2016
2. Write a difference between incomplete dominance and co-dominance 2018

SHORT ANSWER QUESTONS (2/3 MARK)

1. How can you say that gene acts as a unit of recombination? 2016
2. What are lethal genes? In what condition lethality is developed? Give an example to support your answer 2016
3. Give one animal example which developed polyploids races. Why are polyploids rare in animals?
4. Basic chromosome number of *Solanum* is 12. What will be its chromosome number in hexaploid? 2016
5. Name any the gene loci of Drosophila 2017
6. Write any the properties of multiple alleles. 2017
7. What is erythroblastosis foetails ? How can it be prevented? 2018
8. What incomplete dominance? How does it differ from co dominance? 2019
9. What will be the chance of producing normal and haemophilic sons and daughters from a marriage of a normal man (XY) with a carrier woman (xhx)? Show it with a cross. 2019
10. Write the meaning of the symbols in pedigree chart

2019
11. How did Mendel consider the materials for his hybridization experiment? 2020

LONG ANSWER QUESTIONS (5/6 MARKS)

1. A woman's second baby is stilled birth, Doctors are of the opinion that the death may be due to HDN. Explain the development of HDN. 2016
2. Define point mutation. What types of point mutation are shown by the following genes? Give
   Wild type ATGACC AGGTC
   I. ATGACTAGGTC
   II. ATGACA CAGGTC
   III. ATGACAGGTC 2016
3. What is polygenic inheritance? Explain with suitable example. 2020
4. Explain supplementary gene with suitable example 2020
5. Write down the benefits of genetic counselling. 2020
6. Write blood group is expected among the children of a marriage where the father is O blood group and mother is B blood group? 2020

LONG ANSWER QUESTIONS (10/12 MARKS)

1. What is SRY? Where is its location? Give a comparative account of sex determination in *Drosophila* and Man 2016
2. Differentiate an epistatic gene from a hypostatic gene How coat colours in dogs and mice show

the phenomenon of dominant and recessive epistasis respectively? Support your answer with suitable crosses. 2016

3. With a detailed explanation on the genetics of blood group in that human ABO blood group system is an ideal example of co-dominance. 2017
4. Explain Mender's 2nd law with the help of a cross between a black short haired guinea pig (BBSS) brown long haired guinea pig (bbss). Why this law is called law of independent assortment? 2017
5. Describe supplementary and complementary gene interactions with suitable crosses 2017
6. How does position effect alter the functioning of a gene? Write the position effect variegation.
7. Explain modern concept of gene and describe various interactions to produce a trait. 2018
8. What is point mutation? How are single gene inheritance affect humans? Write the importance genetic counselling. 2018
9. In humans a series of alleles have been associated with the ABO blood type as follows: I^A, A type; I^B, B type; I^O, O type. I^A and I^B are co-dominants, I^A I^B heterozygotes have AB blood type, I^O is recessive to both I^A and I^B. What phenotypes and ratios might be expected from the following mating?
   i. $I^A I^A$ x $I^B I^B$
   ii. $I^A I^B$ x $I^O I^O$
   iii. $I^A I^O$ x $I^B I^O$
   iv. $I^A I^O$ x $I^O I^O$ 2019

10. Why Y chromosome is referred to as genetically inert? How Baar body helps sex determination in human beings? Describe sex determination *Drosophila*. 2019
11. What is Mendel's second law of independent assortment? Explain the law by crossing a black Short-haired guinea pig (BBSS) with a brown long-haired guinea pig (bbss). Why this law is called Mendel's law of independent assortment? 2020
12. When Mendelian ratio is 9:3:1:1 modified? Explain how Mendel's ratio is modified when crossing between hornless or polled white (PPWW) and horned red (ppww) cattle, where the Hornless or polled (P) and white (W) is codominant with red (w) coat colour. 2020
13. What is chromosomal aberration? Describe the various types of chromosomal aberration. 2020
14. What are the single-gene disorders? Explain the diseases of single gene disorder with reference to man. 2020
15. What are multiple alleles? Explain the multiple alleles with reference to blood groups in man. 2020

UNIT 6: MOLECULAR GENETICS AND TOOLS

MCQ 1 MARK

1. Restriction endonucleases to cut DNA molecule was used for the first time by 2016
   (a) Nathans
   (b) Boveri
   (c) P. Berg
   (d) C. Venter

2. PCR isa 2018
   (a) Machine
   (b) Technique
   (c) Reaction
   (d) Brand

3. Which one of the following can be used as markers of genes they occurred in and can be

detected by Southern Blotting? 2020

(a) RFLP
(b) RALP
(c) RADF

4. Southern blotting technique is used to transfer…….from gel into a membrane 2019
   (a) Protein
   (b) DNA molecule
   (c) RNA molecule
   (d) water molecule

VERY SHORT ANSWER QUESTIONS (1 MARK)

1. How AFLP differ from RFLP 2017
2. What are restriction enzymes? 2017
3. An enzyme recognizes restriction sites and cleaves the DNA molecules and protects all from vital infection by degrading the invading nucleic acid of virus and also known as molecular scissors or knife. Name the enzymes. 2017
4. Define DNA fingerprinting 2017
5. What do you mean by genome of an organism? 2019

SHORT ANSWER QUESTONS (2/3 MARK)

1. Write three applications of RAPD 2016
2. Define RFLP, Southern blot and Northern blot. 2016
3. What is Hap Map? How is it developed? Give one important of it. 2016
4. What is PCR? Write the requirements of PCR. 2017
5. Write a brief on Human Genome Project 2017
6. What are the uses of restriction endonuclease enzyme in the host and genetic engineering? 2018
7. What are molecular markers? Name some nonspecific makers. How are they useful in determining the Polymorphism 2018
8. What is gel electrophoresis? Name any two types of gel used in electrophoresis 2019
9. What is VNTR? Why do we use VNTR in establishing paternity and maternity dispute? 2019
10. What is DNA fingerprinting used for? 2020
11. Write three applications of RFLP. 2020
12. What is PCR? Write the requirement of PCR. 2020