# JKBOSE PATTERN
# TEST PAPER-2024
# CLASS - XII
# SUBJECT ZOOLOGY
# ANSWER & SOLUTIONS

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## ANSWER AND SOLUTIONS

### Section A

Qno.1 Golgi complex

Qno.2 Nicotine

Qno.3 Klinefelter's syndrome

Qno.4 Xo type

Qno.5 Gene therapy

### Section B

Qno.6 What is semen? Mention its pH and composition

Ans. *Semen is a collection of secretions from the seminal vesicles, prostate gland and cowper's glands and sperms from testes

*Semen is alkaline in nature having pH of 7.35 to 7.50. It contains fructose, calcium and some enzymes.

Qno.7 What are homologous organs? Give two examples

Ans. **Homologous organs:**

*Organs with similar in basic structure and developmental origin but may perform different functions and show different appearance.

*Homologous organs are an important evidence of "divergent evolution" e.g.,

*Forelimbs of vertebrates like seal, birds, bats, horse, man etc.

*Spine of opuntia and leaf of any plant

Qno.8 Give some applications of DNA fingerprinting

Applications of DNA fingerprinting

*DNA fingerprinting is used as an identification tool to solve criminal cases.

*It is also used to solve paternity issues.

*DNA fingerprinting is used to trace hereditary path of diseases.

*It is used to determine the lineages of humans and other animals.

*DNA fingerprinting has been accepted as an evidence in the law courts since 1986.

Q9. Write a short note on *Bt*-cotton.

Answer: Bt cotton is a transgenic cotton plant resistant to several insect attacks containing Bt-gene of *Bacillus thuringiensis*. *Bacillus thuringiensis* produce proteins that kill certain insects like lepidopterens(tobacco budworm and armyworm), colepterans (beetels) and dipterans (flies, mosquitoes).

**Bacillus thuringiensis* produce crystals that contain a toxic insecticidal protein. This toxic protein present in bacterium as inactive protoxins but as soon as insect ingest the inactive form due to alkaline pH of gut, it converted into an active form of toxin and bind to surface of midgut epithelial cells and create pores that cause cell swelling and lysis and eventually death of insects.

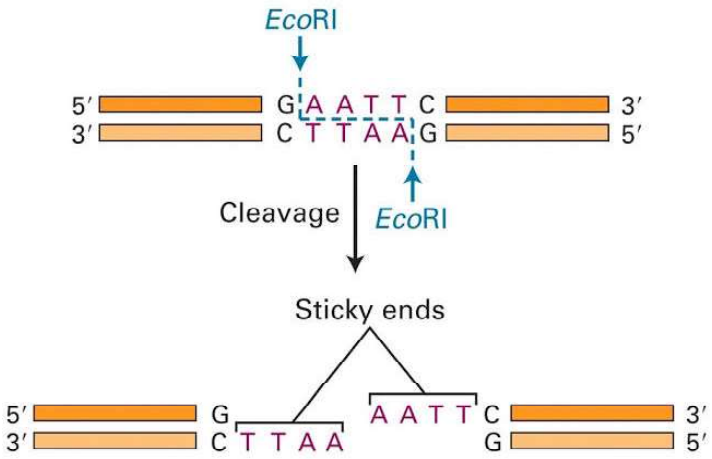
*The gene from *Bacillus thuringiensis* has been incorporated into several crop plants like cotton, maize, rice etc. The toxin is coded by a gene named cry. The protein coded by the genes crylAb and cryllAb control the cotton bollworms, crylAb controls corn borer.

Qno.10: What are restriction enzymes? Explain briefly with the help of an example

Ans. *Restriction enzymes are endonucleases which function by inspecting the length of a DNA sequence.

*Once it finds its specific recognition sequence,chariterised by pallindromic sequence,it binds to the DNA and cut each of the two strands of the double helix at specific points in their sugar phosphate backbones

Examples EcoR I, Hind II, etc.




## Section C

Qno.11.How are cancerous cells different from normal cells? Explain briefly some reasons that convert normal cells into cancerous cells

| | Cancer cells | Normal cells |
|---|---|---|
| 1. | Divide in an unregulated/ uncontrolled manner | 1. Divide in a regulated manner |
| 2. | Immortal | 2. Have definite life span |
| 3. | Show loss of contact inhibition | 3. Show phenomenon of contact inhibition |

### Causes of cancer:

*Transformation of normal cells into cancerous neoplastic cells may be induced by physical , chemical or biological agents (carcinogens).

*Ionizing radiations like x-rays and gamma rays and non ionizing radiations like UV cause DNA damage leading to neoplastic transformation.

*Chemical carcinogens present in tobacco smoke have been identified as major cause of lung cancer.

*Similarly certain viruses called oncogenic viruses have been reported to cause cancer.

Qno.12 What are Mendelian disorders? Discuss any two recessive Mendelian disorders

Ans. Mendelian disorders are mainly determined by alteration or mutation in the single gene.

Example 1

Hemophilia ( Royal Disease)
*First reported by john otto in 1803.

*Hemophilia is a sex linked disease( X- linked) which is also known as Bleeders disease as the patient continuously bleed even from a minor cut.

*Hemophilia is characterized by absence of anti-hemophilic globulin or factor VIII( H-A) and plasma thromboplastin or factor IX [( H-B) or Christmas disease]

*Due to continuous bleeding the patient may die due to blood loss.

*There is no permanent cure of the disease.
Hemophilia is caused genetically due to the presence of recessive sex linked gene- "h" carried by X chromosome.

*A female becomes hemophilic only when both its X chromosomes carry the gene ($X^hX^h$).

*However such females generally die before birth because the combination of these two recessive alleles is lethal.

*In case of males a single gen for the defect is able to express itself as the Y-chromosome is devoid of any corresponding allele($X^hY$).

## Example 2. Phenylketonuria

*It is an autosomal recessive gene/Mendallian disorder.

*The affected individuals lack enzyme phenylalanine hydoxylase, required for the

conversion of amino acid phenylalanine into tyrosine.

*The accumulated phenylalanine is converted into phenylpyruvic acid, which drastically effects the cells of CNS causing mental retardation, slow growth rate and early death.

*PKU has pleiotropic effects.

*People with PKU cannot make tyrosine, an amino acid needed for protein synthesis, production of the hormone thyroxine and adrenalin and production of the skin pigment melanin

Qno. 13 Give three main differences between follicular phase and luteal phase of menstrual cycle

**Ans:**

| | Follicular Phase | Luteal phase |
|---|---|---|
| I. | It extends for about 10 days usually from day 5th to 14th in a 28 day cycle | I Extends for about 13 to 14 days (usually from day 15 to 28) |
| II | Primary follicle changes into mature Graaffian/Ovarian follicle | II Empty Graafian follicle changes into corpus luteum |
| III. | Oestrogens are secreted | III Progesterone is secreted |

Qno.14 Briefly explain three main similarities between Darwinism and modern theory of evolution of life on the earth

Answer: The three similarities between Darwinism and Modern Theory of Evolution of Life are

1.Variations: Variation is the law of nature. Darwin stated that variations exist in populations and they can be continuous or discontinuous (mutations). On the basis of their effect, the variations can be harmful, useful or neutral. Darwin proposed that living organisms are able to adapt to changing environment due to useful continuous variations, which give them competitive advantage

2. Natural selection: Nature selects individuals with useful variations from a heterogenous population, this was called Natural Selection by Darwin and survival of the fittest by Herbert Spencer

3. Inheritance of the useful variations: Darwin stated that selected individuals pass the useful variations to the next generations and so next generations are born fit to the changed environment

4. Speciation: According to Darwin, the useful variations keep on accumulating over generations and a new species is formed

Qno. 15. List the harmful effects caused by alcohol/drug abuse

Answer:

*The immediate adverse effects of drugs and alcohol abuse are manifestated in the form of reckless behaviour, vendalism, and violence,

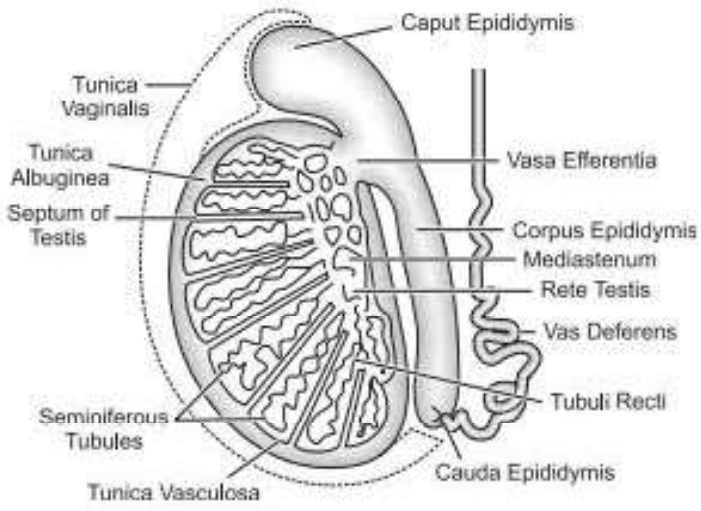
*Excessive doses of drugs may lead to coma, and death due to respiratory failure,heart failure or cerebral haemorrhage.

*A combination of drugs along or their intake alcohol generally results in overdosing and even deaths

*The most common warning signs of drug and alcohol abuse among youth include drop in academic performance ,unexplained absence from school/ colleges, lack of interest in personal hygiene withdrawal, isolation, depression, fatigue, aggressive and rebellious behaviour ,deteriorating relationships with family and friends, loss of interest in hobbies, change in sleeping and eating habits, fluctuations in weight, appetite, etc.

Section D.

Qno.16 With the help of a neat and labeled diagram, briefly explain the anatomy of human testes




·The testes are a pair of oval shaped structures situated outside the abdominal cavity in a pouch called **scrotum,** which help in maintaining the low temperature (2-2.5$^0$C) of testes necessary for sperm production or spermatogenesis.

·Each testis has about 250 testicular lobules and each lobule contain 1-3 highly coiled **seminiferous tubules** in which sperms are produced. Each seminiferous tubule is lined by two types of cells, **spermatogonia** (male germ cell) and **Sertoli cells.** Spermatogonia are precursor cells for sperms or spermatozoa while **Sertoli cells** provide nourishment to the developing sperms till maturity the sertoli cells are influenced by follicle stimulating hormone (FSH) of pituitary gland.

·**Leydig cells** or interstitial cells are endocrine cells present around the seminiferous tubules synthesize and secrete androgen hormone. The cells are under the control of luteinising hormone (LH) and interstitial cell stimulating hormone (ICSH).

OR

Question: Give five main differences between spermatogenesis and oogenesis

Answer

| Spermatogenesis | Oogenesis |
|---|---|
| I. Occurs in testes | I. Occurs in ovaries |
| II. It starts at puberty and is completed without an arrest. | II. It starts during foetal life and involves sevral arrests till completion. |
| III. A secondary spermatocyte divides to form two secondary spermatocytes | III. A secondary oocyte divides to form one ootid and one polar body |
| Iv. No polar body is formed | Iv. Polar bodies are formed |
| v. A spermatogonium forms four spermatozoa | V. One oogonium forms one ovum |