

Roll No. _____ (To be filled in by the candidate)

Maximum Marks : 17

Biology 

224-1st Annual - (Inter Part-II)

Time Allowed : 20 Minutes

PAPER – II (Objective Type)

Group - II

PAPER CODE = 8468

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number, Use marker or when to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1. The methyl containing nitrogenous base is:
 (A) uracil ● (B) cytosine (C) thymine (D) adenine
2. Fresh water ecosystem covers less than:
 (A) 2% (B) 3% (C) 1% ● (D) 97%
3. Tapeworm is primary parasite of:
 (A) octopus (B) pig (C) cattle (D) man ●
4. Rickets is caused by the deficiency of:
 (A) vitamin D ● (B) vitamin C (C) vitamin A (D) vitamin B
5. The negative physiological changes in our body are called:
 (A) regeneration (B) abnormalities (C) degeneration (D) aging ●
6. The inexhaustible resource of energy on earth is:
 (A) coal energy (B) solar energy ● (C) fossil fuel (D) natural gas energy
7. Archeobacteria tolerate temperature about:
 (A) 100 °C (B) 120 °C ● (C) 80 °C (D) 40 °C
8. The homologous chromosomes get separated during:
 (A) Prophase - I (B) Anaphase - I ● (C) Telophase - I (D) Metaphase - I
9. MODY starts before:
 (A) 50 years (B) 30 years ● (C) 40 years (D) 25 years
10. Sarcoplasmic Reticulum are devoid of:
 (A) Lysosomes ● (B) chloroplast (C) peroxisomes (D) Ribosomes
11. The effective drug for Parkinson's disease is:
 (A) Nicotine (B) AZT (C) L.dopa ● (D) GDNF
12. Apical dominance is caused by:
 (A) Auxins ● (B) gibberellins (C) ethene (D) cytokinins
13. Which one of the given is non-sense codon?
 (A) UAA ● (B) UCC (C) UCG (D) UCU
14. The commonly used restriction enzyme is:
 (A) EcoR1 ● (B) Bam H1 (C) pBR 322 (D) pSC 10
15. Excretory structures present in cockroach is:
 (A) Nephridia (B) Malpighian tubules ● (C) Contractile Vacuole (D) Flame cells
16. Cystic Fibrosis patients lack gene that code for transmembrane carrier of:
 (A) Chloride Ions ● (B) Carbonate Ions (C) Bromide Ions (D) Sulphate Ions
17. Which one is Parthenogenic fruit?
 (A) Mango (B) Pineapple ● (C) Peach (D) Apple

320-(IV)-1stA 424-24000

Roll No. _____ (To be filled in by the candidate)

Biology**224-1st Annual - (Inter Part-II)****Time Allowed : 2.40 Hours****PAPER – II (Essay Type)****Group - II****Maximum Marks : 68****SECTION - I****2. Write short answers to any eight (8) questions:****8×2 = 16**

- (i) Account one each main adaptation in plants to high and low temperatures.
- (ii) Why does filtration takes place only at glomeruli part of Nephron and nowhere else?
- (iii) Mention two metabolic altered states that generally (70%) cause kidney stone formation.
- (iv) What are unguligrade? Give example
- (v) Name the unpaired bones of cranium.
- (vi) What is pulvinus? Write down its role in turgor movements.
- (vii) Define Haploid parthenogenesis. Give example.
- (viii) Name disease caused by Treponema pallidum. Also write down its two symptoms.
- (ix) Define soil. Mention its one role and one problem.
- (x) What are plankton? Give their two types.
- (xi) What is limnetic zone? Mention its life.
- (xii) What is meant by Hydroelectric power? write down its advantages.

3. Write short answers to any eight (8) questions:**8×2 = 16**

- (i) Is it possible to eliminate biorhythms in an organism?
- (ii) Describe exocrine and endocrine function of pancreas.
- (iii) What happens when dopamine production is stopped in brain?
- (iv) Why AB blood group is universal recipient
- (v) What is pleiotropy? Give one example.
- (vi) What is vortex mixing technique?
- (vii) What is testicular feminization syndrome?
- (viii) How familial hypercholesterolemia is treated using gene therapy?
- (ix) Why plasmids are naturally present in bacteria?
- (x) Compare ecology with autecology.
- (xi) What is the role of bacteria in leguminous plants?
- (xii) Describe the importance of food chain in an ecosystem.

4. Write short answers to any six (6) questions:**6×2 = 12**

- (i) How is primitive streak formed?
- (ii) What do you know about intercalary meristem?
- (iii) Name and draw the (P-O-C) bond responsible for the stability of nucleic acid molecule.
- (iv) What was the effect of x-rays on neurospora spores in Beadle and Tatum experiment?
- (v) What changes occur in a cell during apoptosis?
- (vi) Why does DNA thread coils every 200 nucleotides around histone protein molecules?
- (vii) What are functions of mitotic apparatus?
- (viii) State theory of special creation.
- (ix) What do you know about fixed alleles?

SECTION - II**Note: Attempt any three (3) questions:****8×3 = 24**

5. (a) Explain through a diagram the thermostat function of hypothalamus and feedback mechanism in human thermoregulation.
(b) Explain the Necrosis and apoptosis in development and growth.
6. (a) Describe sliding filament model. What does it explain?
(b) What do you know about grazing?
7. (a) Describe nervous disorders.
(b) What ideas support the inheritance of acquired characters?
8. (a) Write a note on reproduction system of human female.
(b) Define and explain law of independent assortment.
9. (a) What does embryonic induction mean? Write down the experiments of Spemann and Mangold to demonstrate the phenomenon.
(b) What are restriction endonucleases? Elaborate their importance for bacteria and Recombinant DNA technology?

320-(IV)-1stA 424-25000

Roll No. _____ (To be filled in by the candidate)

Maximum Marks : 17

Biology 

224-1st Annual - (Inter Part-II)

Time Allowed : 20 Minutes

PAPER – II (Objective Type)

Group - I

PAPER CODE = 8467

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number, Use marker or when to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

- Which of the following is not considered as synthesis function of liver?
(A) fibrinogen formation (B) albumin formation (C) urea formation (D) glycogen formation ●
- According to endosymbiont hypothesis, tail in present day cells was developed by ingestion of:
(A) Cyanobacteria (B) spirochete (C) aerobic bacteria (D) mitochondria ●
- Fertilizer and insecticides are similar because both increase:
(A) agriculture produce (B) increase fertility of soil (C) increase soil pollution (D) both (A) and (C) ●
- Which of the following is not true statement?
(A) Neisseria may cause eye infection ● (B) Syphilis is caused by a spirochete
(C) Treponema pallidum can damage the joints (D) Epicutyl growth is damaged by red light
- What is not true about eutrophication?
(A) rise in phosphorus fishes (B) depletion of oxygen
(C) rise in oxygen level ● (D) death of small fishes
- Which of the following is incorrectly matched?
(A) ichthyosis ocular ↔ ocular albinism ● (B) Hypophosphatemia ↔ Hemophilia A
(C) Fragile X-syndrome ↔ Retinitis pigmentosa (D) Iech-Nyhan syndrome ↔ hemophilia-B
- Which one is the wrong pair among the following?
(A) sickle cell anemia ↔ β -chain of hemoglobin (B) penicillium ↔ one chromosome ●
(C) 7 methyle GTP ↔ 5' end of mRNA (D) UGA ↔ tryptophan
- Assuming a man exhibits the phenotype of an x-linked recessive allele, which of the following is true about him, if he marries a woman whose father is normal
(A) all of his daughters will be carriers (B) 50% of his daughters might pass the recessive allele sons ●
(C) all of his sons exhibit the trait (D) 50% of his sons might pass the recessive allele to daughters
- About -----% of energy is lost as heat as byproduct of respiration:
(A) 50 – 60 (B) 60 – 70 (C) 70 – 90 (D) 80 – 90 ●
- Which of the following is wrong statement?
(A) adrenalin e releases glucose from liver ● (B) non- adrenaline releases glucose from liver
(C) sympathetic system is reinforced by epinephrine (D) pupil dilates by parasympathetic system
- At rest, the binding sites on each action chain are recovered by:
(A) troponin ● (B) tropomyosin (C) cross bridges (D) myosin
- The part of brain that controls breathing, heart beat rate and blood pressure is:
(A) midbrain (B) pons (C) medulla ● (D) cerebellum
- 44-autosome plus 2-X-chromosome in home sapiens means:
(A) Down's syndrome ● (B) Turner's syndrome (C) jacob syndrome (D) Normal female
- What is benefit of using a retrovirus as s vector in gene therapy?
(A) it is not able to enter the cells (B) it incorporates foreign genes into the host chromosome ●
(C) it eliminates the unnecessary steps (D) both (B) and (C)
- Indicate true statement:
(A) First amino acid in Alfa-chain hemoglobin is methionine ●
(B) inhibitory effect of apical bud is caused due to auxins
(C) AGA Condon specifies Arginine in mitochondria (D) histones are negatively charged proteins
- Indicate the false statement:
(A) a gain is caused by negative physiological changes ●
(B) inhibitory effect of apical bud is caused due to auxins
(C) higher supply of oxygen inhibits growth of plants (D) red light favors division of cells in plants
- Skeletal muscles and cardiac muscles and different because cardiac muscles are:
(A) multinucleated (B) striated (C) branched ● (D) voluntary

Roll No. _____ (To be filled in by the candidate)

Biology

224-1st Annual - (Inter Part-II)

Time Allowed : 2.40 Hours

PAPER – II (Essay Type)

Group - I

Maximum Marks : 68

SECTION - I



2. Write short answers to any eight (8) questions:

8×2 = 16

- (i) Write down different methods to remove kidney stones
- (ii) What is blubber? in which type of animals, it is found?
- (iii) Why some fishes retain trimethylamine oxide in their bodies?
- (iv) Describes various types of sclerenchyma cells.
- (v) What is the main disadvantage of exoskeleton? How insects deal with problem?
- (vi) Write down characteristics of cardiac muscles.
- (vii) What are day natural plants? Give two examples.
- (viii) What is follicle? How it is related to FSH?
- (ix) Describes some characteristics of profundal zone.
- (x) Elaborate the layering characteristic grassland ecosystem.
- (xi) How the use of hydroelectric power is better than use of fossil fuels?
- (xii) What do you mean by the term afforestation?

3. Write short answers to any eight (8) questions:

8×2 = 16

- (i) How can you differentiate between reflex action and reflex are?
- (ii) What are Pacinian sensory neuron.
- (iii) Draw and label sensory neuron.
- (iv) Why did Mendel devise a test cross?
- (v) Workout all possible types of gametes from the individual having genotype "AaBbCc".
- (vi) Why blood group "O" is called as universal donor?
- (vii) How can you get a gone of interest?
- (viii) What is probe? Give its use.
- (ix) Which technique is used to produce a haploid plant in tissue culture?
- (x) How nitrification differs from denitrification?
- (xi) What are Abiotic components of an ecosystem?
- (xii) Differentiate between Autecology and synecology

4. Write short answers to any six (6) questions:

6×2 = 12

- (i) What are intercalary meristems? Give their role.
- (ii) How CO₂ affects the growth rate in plants?
- (iii) Name the three non-sense codons.
- (iv) Give four differences between DNA and RNA
- (v) what are point mutations?
- (vi) What is metastasis?
- (vii) Define crossing over Give its importance.
- (viii) What are vestigial organs? Give two examples.
- (ix) Name any four species, declared extinct in Pakistan.

SECTION - II

Note: Attempt any three (3) questions:

8×3 = 24

5. (a) Write down a comprehensive note on excretion in plants.
(b) Define cell cycle. Discuss interphase in detail.
6. (a) What are autonomic movements? Discuss their types
(b) Explain predation and parasitism in detail.
7. (a) In what way the feedback mechanism takes place to regulate the Hormonal production?
(b) Describes the phenomena of Green House effect, its cause and impacts.
8. (a) Explain the male reproductive system in human.
(b) Describe the mechanism of incomplete dominance with an example.
9. (a) How embryonic induction was proved by Hans spemann and Hidle mangold?
(b) Write down a note on gene sequencing.

319-(IV)-1stA 424-25000

Gujranwala Board-2023

Roll No. of Candidate : _____

BIOLOGY

Intermediate Part-II , Class 12th (1stA 423- I)

Paper: II Group – I

Time: 20 Minutes

OBJECTIVE Code: 8461

Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.



1. Aldosterone is secreted from
(A) renal cortex (B) adrenal cortex (C) renal medulla (D) adrenal medulla
2. Which of these move first during rapid plant movements leading to exosmosis of water?
(A) K^{+} ions (B) Cl^{-} ions (C) Na^{+} ions (D) NH_4^{+} ions
3. Number of bones in the human skull is
(A) 22 , 6 paired, 10 unpaired (B) 22 , 4 paired, 14 unpaired
(C) 22 , 8 paired, 6 unpaired (D) 22 , 10 paired, 2 unpaired
4. Which of these hormones is used commercially in brewing industry to promote malting
(A) GA (B) GA3 (C) NAA (D) 2,4-D
5. Which of these pituitary hormones control pancreas?
(A) STH and TSH (B) ACTH and TSH (C) ACTH and STH (D) ACTH and ADH
6. Zygote is implanted in
(A) ovary (B) vagina (C) oviduct (D) uterus
7. Apical dominance in plants
(A) suppresses the growth of apical bud (B) causes dense growth of plants
(C) suppresses the growth of lower axillary buds (D) promotes the sprouting of lateral axillary buds
8. The enzyme DNA ligase
(A) constructs RNA primer (B) initiates the replication of DNA
(C) catalyzes the replication of DNA (D) attaches the fragments to the lagging strand
9. In sickle cell anemia, the oxygen carrying capacity of haemoglobin is reduced because
(A) tertiary structure of haemoglobin is altered (B) primary structure of haemoglobin is altered
(C) secondary structure of haemoglobin is altered (D) haemoglobin is completely destroyed
10. Phragmoplast during cytokinesis in plant cells is formed by the fusion of golgi vesicles which originate during
(A) prophase (B) metaphase (C) anaphase (D) telophase
11. Which of these indicates the phenotypic ratio of dihybrid cross?
(A) 1:1:1:1 (B) 9:3:3:1 (C) 1:2:1 (D) 3:1
12. The enzyme involved in the maturation of T and B cells in children is
(A) α – galactosidase (B) β – galactosidase
(C) adenosine hydrolase (D) adenosine deaminase
13. Protoplast culture yields
(A) virus free plants (B) many identical seedlings in a limited space
(C) artificial seeds (D) quinine and digitoxin
14. Hardy-Weinberg's theorem describes the
(A) lamarkism (B) descent with modification
(C) natural selection and adaptation (D) genotype frequency of non-evolving populations
15. Primary succession on a dry soil is called
(A) derosere (B) xerosere (C) halosere (D) hydrosere
16. The most fragile biome is
(A) tundra (B) desert (C) deciduous (D) grassland
17. Which one is a hormonal disorder?
(A) arteriosclerosis (B) haemophilia (C) alzheimer (D) goiter

318-(I)-1stA 423-20000

BIOLOGYIntermediate Part-II, Class 12th (1st A 423)

Paper: II Group – I

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.**SECTION – I****2. Write short answers to any EIGHT questions.**

(2 x 8 = 16)

- i. For what purpose, leaves have large surface area?
- ii. Why dehydration is the major problem for terrestrial animals?
- iii. How can you avoid making of kidney stones?
- iv. Which tissues arise from vascular cambium?
- v. Differentiate between hyaline and elastic cartilage.
- vi. Define callus and describe its importance.
- vii. In which way sertoli cells support reproduction?
- viii. Why testosterone is important for reproduction?
- ix. Differentiate between limnetic and profundal zone.
- x. Name four major ecosystems in Pakistan.
- xi. What is ozone? Give its importance.
- xii. Define soil and give its basic constituents.

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i. Define diurnal rhythms. How they are different from circannual rhythms?
- ii. Compare sympathetic with parasympathetic nervous system.
- iii. How etiolation differs from chlorosis?
- iv. Workout all possible types of gametes from the individual having genotype "AaBbCc".
- v. What do you know about the dominance relations among multiple alleles of "ABO" blood group system?
- vi. What are the limitations of Mendelian law of independent assortment?
- vii. Describe the term "Gene Pharming".
- viii. Why biotechnology is important for humans?
- ix. How to get the gene of interest?
- x. Differentiate between Autecology and Synecology.
- xi. Define mutualism. Give example.
- xii. What do you know about the biotic components of an ecosystem?

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- i. Differentiate between morulla and blastula.
- ii. Define regeneration, also write down two examples.
- iii. What is point mutation? Give one example.
- iv. Define phosphodiester bond, also draw it.
- v. What are chromosomes? Also write down number in man and mouse.
- vi. What is mitotic apparatus? Write down its function.
- vii. Compare kinetochore microtubule with polar microtubule.
- viii. What are hydrothermal vent? How did they support life?
- ix. Define homologous organ, give one example.

SECTION - II

5. (a) Describe the adaptation in plants to low and high temperature. (4)
- (b) Describe the stages of karyokinesis of mitotic cell division. (4)
6. (a) Write down different types of plant movements due to external causes and also describe their importance. (4)
- (b) Define succession. Write down different stages of xerosere in detail. (4)
7. (a) Why is anterior lobe of pituitary gland referred as Master Gland? Explain how does anterior lobe control thyroids, adrenals and gonads? (4)
- (b) Write down a note on endangered species. How they can be protected? (4)
8. (a) Explain the male reproductive system in human. (4)
- (b) Describe the mechanism of incomplete dominance with an example. (4)
9. (a) Define meristem. Discuss its various types. (4)
- (b) What is polymerase chain reaction (PCR)? How it is carried out to produce multiple copies of DNA segment? (4)

Roll No. of Candidate : _____

BIOLOGYIntermediate Part-II , Class 12th (1stA 423- II)

Paper: II Group – II

Time: 20 Minutes

OBJECTIVE Code: 8464

Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1. A localized group of species belonging to the same species is called as
(A) community (B) population (C) ecosystem (D) biosphere
2. In which of the following neurons, length of dendrites is greater than axon
(A) relay neuron (B) sensory neuron (C) motor neuron (D) associative neuron
3. Protein found within spindles is
(A) collagen (B) myosin (C) actin (D) tubulin
4. Which one of the following observations does not match with Darwin's idea of natural selection?
(A) over production (B) survival of the fittest
(C) variations (D) inheritance of acquired characters
5. The tRNA anticodon "GAC" is complementary to the mRNA codon with the sequence
(A) CUG (B) CAG (C) CTC (D) GAC
6. The process of moulting is controlled by the nervous system and a hormone called
(A) aldosterone (B) androgen (C) ecdysone (D) oxytocin
7. Transgenic animals are prepared through
(A) genetic engineering (B) cloning (C) mutation (D) PCR
8. Type of muscle having regular striations and many nuclei per cell
(A) smooth muscle (B) skeletal muscle (C) cardiac muscle (D) all of these
9. It is not a function of kidney
(A) excretion (B) osmoregulation (C) formation of urine (D) formation of urea
10. Which of the following is a renewable resource?
(A) coal (B) oil (C) land (D) natural gas
11. The head can be regenerated in
(A) frog (B) leech (C) earthworm (D) grasshopper
12. *Felis bengalensis* has the zoologist name of
(A) leopard cat (B) leopard (C) cat (D) tiger
13. RNA polymerase consists of
(A) sigma factor (B) sigma factor and core enzyme
(C) core enzyme (D) sigma factor and full enzyme
14. Mature sperms are formed from spermatids through
(A) mitosis (B) meiosis-I (C) meiosis-II (D) differentiation
15. Cell bodies of sensory neurons constitute
(A) dorsal root ganglion (B) dorsal root
(C) ventral root ganglion (D) posterior root ganglion
16. Haemophilia "A" is
(A) x-linked recessive (B) factor viii abnormality
(C) both (A) and (B) (D) factor ix abnormality
17. Which of the following describes aspartame?
(A) anticlotting agent (B) biodegradable plastic
(C) artificial sweetener (D) transgenic bacteria

319-(II)- 1stA 423-20000

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

SECTION – I

2. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- What are the causes of renal failure?
- Differentiate between endotherm and ectotherm.
- What is feedback mechanism?
- What is hydrostatic skeleton? Give one example.
- Compare osteomalacia and osteoporosis.
- What are the causes of muscle fatigue?
- What is the role of phytochromes in plants?
- How diploid parthenogenesis takes place in aphids?
- Which kind of life is present in profundal zone of lake ecosystem?
- What is the impact of humans on temperate deciduous forests?
- What are the causes and effects of greenhouse effects?
- What are the consequences of population increase?

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- What is parasympathetic nerve system?
- How is parkinson's disease caused?
- What is latent learning?
- Differentiate autosomes and sex chromosomes.
- What do you mean by multifactorial trait?
- What are the causes of type-I diabetes?
- What is a probe?
- Give an application of transgenic plants?
- What are the goals of human genome project?
- Define synecology.
- How do fungi give and take benefits in mycorrhizal association?
- Differentiate gross primary production and net primary production.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- Differentiate primary growth from secondary growth in plants.
- Flatworms develop lost body parts. Discuss it.
- One gene – one enzyme hypothesis has been changed to one gene – one polypeptide hypothesis. Comment on it.
- How all organisms use same basic mechanism of reading and expressing the genes?
- A point mutation causes the production of a defective enzyme. Comment on it by referring phenylketonuria.
- Give at least two differences of mitosis and meiosis.
- Just give names of substages of prophase – I of meiosis.
- Differentiate Theory of Special Creation from Theory of Natural Selection.
- Distinguish homologous organs from analogous organs by giving examples.

SECTION - II

- Draw and explain urinary system of man. (4)
 - Discuss meiotic error (non-disjunction) with two syndromes. (4)
- Illustrate the ultrastructure of myofilaments of human skeletal muscle fiber. (4)
 - Describe the flow of energy in the food chain of an ecosystem. (4)
- How is nervous system of Planaria better developed than that of Hydra? Discuss. (4)
 - How does comparative anatomy support evolution? (4)
- What is epistasis? Explain with reference to Bombay phenotype. (4)
 - Describe vernalization. Give its importance. (4)
- Why did Spemann designated the dorsal lip area as primary organizer? Explain with his experiment. (4)
 - What is genomic library? How would you locate a gene of interest in the library? (4)

Gujranwala Board-2022

Roll No. of Candidate : _____

BIOLOGY

(Intermediate Part-II, Class 12th) 422 - (I)

Paper II

(Group – I)

Time: 20 Minutes

OBJECTIVE Code: 8461

Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.



1. Fresh water flatworms excrete very dilute _____.
(A) plasma (B) tissue fluid (C) uric acid (D) urine
2. Rickets is a disease in children with _____.
(A) soft bones (B) herniation
(C) bowed legs and deformed pelvis (D) arthritis
3. The living cells of cartilage are called _____.
(A) chondrocytes (B) osteoblasts (C) osteocytes (D) osteoclasts
4. Antidiuretic hormone (ADH) is also called as _____.
(A) oxytocin (B) vasopressin (C) androgen (D) oestrogen
5. Menstruation usually lasts for _____ days.
(A) 3 – 7 (B) 3 – 9 (C) 1 – 3 (D) 1 – 2
6. An inevitable process is _____.
(A) regeneration (B) induction (C) abnormal development (D) aging
7. Meristems are young tissues or group of cells that retain the potential to _____.
(A) penetrate (B) regenerate (C) divide (D) survive
8. Which one bears greater molecular mass among following nitrogenous base of nucleic acid _____.
(A) guanine (B) thymine (C) cytosine (D) uracil
9. The plane of new cell wall formation in a dividing cell is determined by _____.
(A) microtubules (B) golgi bodies (C) endoplasmic reticulum (D) mitotic apparatus
10. The significance of mitosis is that it _____.
(A) takes place in all cells (B) ensures the survival
(C) occurs under adverse conditions (D) produces identical cells
11. Enlargement of liver and spleen occurs in _____.
(A) haemophilia (B) pleiotropy
(C) erythroblastosis foetalis (D) hypophosphataemic rickets
12. Which one is used to make the animal eggs transgenic?
(A) particle gun (B) by agrobacterium (C) vortex mixing (D) micropropagation
13. For the treatment of familial hypercholesterolemia patients, a normal gene is inserted into patients through _____.
(A) retrovirus (B) agrobacterium (C) any bacterium (D) phage virus
14. Archaeobacteria can tolerate temperature upto _____.
(A) 120 °C (B) 130 °C (C) 140 °C (D) 110 °C
15. Succession is initiated by a few hardy invaders called _____.
(A) predators (B) pioneers (C) parasites (D) grazers
16. The desert ecosystem in Western Punjab is known as _____.
(A) Thar (B) Thal (C) Cholistan (D) Sahara
17. The population of Pakistan at the time of independence in 1947 was _____ million.
(A) 31.5 (B) 32.5 (C) 33.5 (D) 30.5

317-(I)-422-24000

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION - I)**2. Write short answers to any EIGHT questions.**

(2 x 8 = 16)

- What is a renal failure?
- Justify the importance of kidneys as vital organs.
- Conclude whether hemodialysis or peritoneal dialysis is better than the other one.
- How many different regions are present in vertebral column? Name them. Also write down number of vertebral in each region.
- Differentiate between cartilaginous joints and synovial joints.
- Define smooth muscles.
- What is the stimulus for ovulation in oestrous cycle?
- Define genital herpes.
- Write down plant and animal life of tundra ecosystem.
- Differentiate between phytoplankton and zooplankton.
- What are the consequences of population increase?
- What are four different effects of acid rain?

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- How epilepsy is characterized and diagnosed?
- Give any two types of hormones with examples on the basis of composition.
- Justify that calcitonin is antagonistic to parathormone.
- Differentiate between phenotype and genotype.
- Differentiate between diabetes mellitus type-I and diabetes mellitus type-II.
- Give example and illustrate sex limited trait.
- Narrate how gene of interest can be made from mRNA?
- What are palindromic sequences? Write down palindromic sequence for Eco R1.
- How bacterial cells can take up recombinant plasmid?
- Differentiate between primary and secondary consumers.
- Give an example and write down about commensalism.
- Justify that lichens are examples of mutualism.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- If all the cells contain same nuclear material, what causes the cells to differentiate?
- Which type of cleavage is found in bird's egg? Discuss briefly.
- Enlist initiation codon and nonsense codons.
- Why a cap and tail is added to mRNA?
- What is transformation?
- Sketch and label cell cycle.
- What is metastasis?
- Which idea is known as endosymbiont hypothesis?
- What is the difference between endangered species and threatened species?

(SECTION - II)

- Give osmoregulatory adaptations in terrestrial animals. (4)
 - Define ecosystem. Describe its components. (4)
- Explain the type of growth in plants due to which diameter of their stem increases. (4)
 - What is genetic code? Explain the essential features of genetic code. (4)
- Suggest the various commercial applications of auxins & gibberellins. (4)
 - Describe the various reasons for world population explosion. (4)
- Explain and draw human female reproductive cycle. (4)
 - Write down a note on "Epistasis" and "Bombay Phenotype". (4)
- Explain the phenomenon of embryonic induction. (4)
 - Many factors can alter the gene frequency. Discuss various factors responsible for evolutionary change. (4)

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.



1. Blood group AB of both parents can have babies of which blood groups?
 (A) A (B) B (C) O (D) AB , A , B
2. Primary growth in plants is caused by _____.
 (A) apical meristem (B) lateral meristem (C) intercalary meristem (D) open meristem
3. Neurula is the stage in which embryo has _____.
 (A) blastocoel (B) germ layers (C) neural tube (D) archenterons
4. The nastic movements are _____.
 (A) directional (B) non-directional (C) spontaneous (D) all of these
5. Grass land without trees are called _____.
 (A) prairies (B) pampas (C) savanna (D) rainy grassland
6. Which one is not a steroid hormone?
 (A) oestrogen (B) cortisone (C) testosterone (D) insulin
7. The paired bones of cranium are parietal and _____.
 (A) occipital (B) ethmoid (C) sphenoid (D) temporal
8. For maturation of T and B cells the enzyme required is _____.
 (A) GDA (B) TDA (C) ADA (D) CDA
9. All the food chains begin with _____.
 (A) primary consumer (B) producer (C) secondary consumer (D) decomposer
10. Each nephridium of earthworm opens to the exterior by _____.
 (A) nephrostome (B) nephridiopore (C) anus (D) cloaca
11. Pachytene is characterized by _____.
 (A) crossing over (B) condensation (C) maturation (D) differentiation
12. The smallest biological unit that can evolve over time is _____.
 (A) cell (B) organism (C) population (D) species
13. The principal source of energy is _____ energy.
 (A) nuclear (B) solar (C) geothermal (D) tidal
14. Corpus leuteum secretes.
 (A) FSH (B) progesterone (C) LTH (D) LH
15. G₀ stage lasts for life time in _____.
 (A) nerve cells (B) eye lens cells (C) sex cells (D) both (A) & (B)
16. In bacteria the newly synthesized mRNA is released in _____.
 (A) nucleus (B) cytoplasm (C) mitochondria (D) both (B) & (C)
17. Which one is incorrectly matched?
 (A) protoplast – plant cell engineering (B) DNA polymerase – PCR
 (C) RFLPS – DNA finger printing (D) DNA ligase – mapping human chromosomes

Time: 2:40 Hours

SUBJECTIVE

Marks : 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION - I)

2. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- How negative feedback mechanism helps body to regulate temperature?
- How do bony fishes excrete extra salt in marine environment?
- Give the adaptations of plants in freezing temperature for thermoregulation.
- Differentiate between phototropism and chemotropism.
- What are synovial joints? Name its types.
- What is the cause of muscle fatigue?
- Highlight the uses of clone cells for investigating use of pharmaceutical products.
- Differentiate between oviparous and viviparous animals.
- What are planktons? Give their types.
- What is layering? Give one example of each layer.
- Differentiate between afforestation and reforestation.
- Define pollution. Write down names of its types.



3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- Give the difference between chlorosis and etiolation.
- How is it that different nerve fibres transmit different modalities of sensation?
- What is Nissl's granules? Give their relation to Golgi bodies.
- Differentiate between phenotype and genotype.
- Explain gene pool for a single particular trait.
- What is probability?
- How to get a gene of interest?
- What are plasmids? Give their types and functions.
- What are RFLPs? Give their importance.
- Define and explain community ecology.
- Discuss abiotic components of an ecosystem.
- Differentiate between hydrosere and xerosere succession.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- How thickness of plant body increases?
- How missing organs of an adult animal develop? Discuss it.
- In which direction DNA polymerase synthesizes new strands of DNA. Comment on it.
- What is nucleosome?
- Differentiate between conservative and semi-conservative DNA replication.
- What is metastasis?
- Distinguish apoptosis from necrosis.
- What are vestigial organs? Give examples.
- Differentiate between endangered from threatened species.

(SECTION - II)

- What are different problems associated with kidney? How can they be cured? (4)
 - Explain grazing in detail. Discuss ill effects of over-grazing? (4)
- Demonstrate the ultrastructure of myofilaments. (4)
 - Describe Watson and Crick's model of DNA. (4)
- How action potential is produced in a neuron? Discuss different factors involved in action potential. (4)
 - Explain the phenomenon of eutrophication. (4)
- Write down a note on seed dormancy. (4)
 - Explain epistasis with the help of an example. (4)
- Describe the role of nucleus in development. (4)
 - When did Charles Darwin presented his theory "The origin of species"? Highlight the main points of this theory. How was this theory modified later? (4)

Gujranwala Board-2021

Roll No. of Candidate : _____

BIOLOGY

(INTERMEDIATE PART-II) 421 - (III)

Paper II

(Group - I)

Time: 20 Minutes

OBJECTIVE Code: 8465

Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.



1. Period of life cycle of cell between two consecutive divisions is termed as
(A) resting phase (B) interphase (C) G1-phase (D) S-phase
2. Reproduction is necessary for the survival of
(A) individual (B) species (C) community (D) biome
3. Which of the following is a renewable resource?
(A) oil and air (B) water and oil (C) oil and gas (D) air and water
4. The basic functional unit of ecology is
(A) ecosystem (B) population (C) niche (D) community
5. Expression of a trait is termed as
(A) phenotype (B) genotype (C) wild type (D) mutant type
6. A plant adapted to remove the flooding of its cells in fresh water is
(A) xerophyte (B) mesophyte (C) hydrophyte (D) geophyte
7. A group of bacteria that can tolerate temperature upto 120°C.
(A) eubacteria (B) mycoplasma (C) E-Coli (D) archaeobacteria
8. Which bone does provide attachment site for muscle?
(A) spongy bone (B) soft bone (C) cartilage (D) compact bone
9. Recombinant DNA is introduced into the host cell by means of a
(A) phage (B) vector (C) bacterium (D) fungus
10. Which one is not a mesophyte?
(A) cactus (B) mango (C) rose (D) brassica
11. Movement and rearrangement of the cells in the embryo is called
(A) gastrulation (B) cleavage (C) fertilization (D) blastula
12. Bundle caps in sunflower stem are formed by
(A) parenchyma (B) sclerenchyma (C) mesenchyma (D) collenchyma
13. The average rainfall in temperate deciduous forest is between
(A) 600 – 1500 mm (B) 650 – 1500 mm (C) 750 – 1500 mm (D) 700 – 1500 mm
14. For the formation of phragmoplast, the vesicles originate from
(A) endoplasmic reticulum (B) ribosome (C) golgi complex (D) chloroplast
15. Primary growth in plants is caused by
(A) lateral meristem (B) intercalary meristem (C) apical meristem (D) secondary meristem
16. Chromosomes appear inside the nucleus at the time of
(A) cell elongation (B) cell maturation (C) cell differentiation (D) cell division
17. Plant hormones, which are indole acetic acid or its variants are
(A) auxins (B) gibberellins (C) ethene (D) abscisic acid

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Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION – I)

2. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i. What is lithotripsy?
- ii. Define panting with one example.
- iii. Define dialysis. Give its types.
- iv. Distinguish between origin and insertion of muscles.
- v. What is hematoma formation?
- vi. What are floating ribs?
- vii. What is follicle atresia?
- viii. Define parthenocarpy with examples.
- ix. Give the name of some major ecosystems in Pakistan.
- x. Compare littoral zone with limnetic zone.
- xi. What is acid rain?
- xii. What are two main sources of water pollution?

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i. What are diurnal rhythms and circannual rhythms?
- ii. Write down any two functions of ethene.
- iii. What are neurotransmitters? Give one example.
- iv. Differentiate between genotype and phenotype.
- v. What is over dominance?
- vi. What are secretors?
- vii. Write down a note on restriction endonuclease and give its one function.
- viii. What is probe? Write down its role.
- ix. Write down a note on Taq Polymerase.
- x. What is niche?
- xi. Write down biotic components.
- xii. Write down a note on root nodules.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- i. Write down the role of auxins and cytokinins in apical dominance.
- ii. How development is affected by ionizing radiations and nutritional deficiency?
- iii. Define promoter region. Which binding sites are present in this region?
- iv. Which is true DNA replicating enzyme in E.Coli? Also write its structural features.
- v. How eukaryotic m RNA is modified? What is the significance of this modification?
- vi. What is the cause of Klinefelter's syndrome? Write down the symptoms of this disease.
- vii. Differentiate between G₀ and G₁ phases of cell cycle.
- viii. Define population and population's gene pool.
- ix. What is endosymbiont hypothesis? Who proposed this hypothesis?

(SECTION - II)

5. (a) Give a detailed account of nitrogen cycle. 4
- (b) Define nephron. Discuss its structure and function in detail. 4
6. (a) Write down a note on sclerenchyma cells and collenchyma cells. 4
- (b) Explain Watson and Crick's model of DNA. 4
7. (a) Describe in detail the role of adrenal glands. 4
- (b) Describe the causes and effects of acid rain. 4
8. (a) Discuss the process of birth in human female. 4
- (b) Explain codominance with the help of MN blood group system in man. 4
9. (a) Define regeneration. Describe the mechanism of regeneration in planaria and salamander. 4
- (b) Explain the evolution of eukaryotes by endosymbiotic hypothesis and membrane invagination hypothesis. 4

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1. The most common chronic arthritis which is a degenerative joint disease, also caused by
 (A) hormonal defects (B) ☒ genetic defects (C) nutritional defects (D) neural defects
2. Chromosomes appear inside the nucleus at the time of
 (A) cell elongation (B) cell maturation (C) cell differentiation (D) ☒ cell division
3. Genomic fragments can be separated according to their lengths during
 (A) PCR (B) gene cloning (C) ☒ gel electrophoresis (D) chemical cleavage
4. Who defined "Niche" as species occupation?
 (A) Grinnell (B) ☒ Charles Elton (C) Cuvier (D) Haeckel
5. Establishing new forests where no forests existed before
 (A) desertification (B) deforestation (C) reforestation (D) ☒ afforestation
6. Fruit ripening is often accompanied by a burst of respiratory activity called as
 (A) photoperiod (B) fertilization (C) ☒ climacteric (D) reproduction
7. Haemophilia 'C'
 (A) ☒ affects both sexes equally (B) affects men more than women
 (C) affects women more than men (D) is non-allelic sex linked recessive
8. The change in frequency of alleles at a locus that occurs by chance is
 (A) gene pool (B) mutations (C) ☒ genetic drift (D) migration
9. Synapsis takes place in
 (A) leptotene (B) ☒ zygotene (C) pachytene (D) diplotene
10. The beginning of bone formation, starts after injury
 (A) ☒ 3 - 4 weeks (B) 2 - 3 months (C) 8 weeks (D) 8 - 12 weeks
11. The nature of shivering thermogenesis adaptation is
 (A) structural (B) ☒ physiological (C) psychological (D) behavioral
12. Northern coniferous forests are called as
 (A) alpine (B) boreal (C) ☒ taiga (D) prairies
13. Multicellular alga, Acetabularia is attached to the ground by
 (A) roots (B) hold fast (C) ☒ rhizoid (D) base
14. Increased plasma level of urea is an indication of
 (A) ☒ renal failure (B) urinary tract infection
 (C) kidney stones (D) sexually transmitted disease
15. If a person has 44 autosomes and xyy, he will suffer from
 (A) ☒ klinefelter's syndrome (B) turner's syndrome
 (C) down's syndrome (D) mongolism
16. The most prominent structure found in 18 hrs chick embryo is
 (A) primitive streak (B) ☒ notochord (C) hensen's node (D) neurocoel
17. In mitochondria, the codon UGA signals for
 (A) start (B) ☒ tryptophan (D) methionine

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION – I)

2. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- Differentiate between hypotonic and hypertonic environments.
- Which nitrogenous wastes are produced by the metabolism of purine and pyrimidine?
- Differentiate between ureter and urethra.
- What are collenchyma cells?
- Write down any two major functions of the skeletal system.
- Write down a note on hematoma formation.
- Differentiate between oviparous and viviparous.
- Define gonorrhoea in detail.
- How temperate deciduous forests were affected by human impact?
- Write down a note on productivity.
- How forests play their role on climate?
- What are two main sources of water pollution?

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- Give the commercial applications of gibberellins.
- What are effectors? Give their types.
- What is Parkinson's disease?
- Compare Allele with multiple alleles.
- What is product rule?
- Differentiate between sex chromosomes and autosomes.
- What are transgenic plants?
- What is cystic fibrosis?
- What is gene sequencing?
- Differentiate between Biomes and Biosphere.
- What are producers and consumers?
- What is commensalism?

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- Differentiate between maturation and differentiation.
- Define growth correlations.
- Differentiate between heterochromatin and euchromatin.
- What are okazaki fragments?
- Differentiate between nucleotides and nucleosides.
- Explain briefly prophase in mitosis.
- How malignant tumor or cancer is caused?
- Differentiate between homologous organs and analogous organs.
- What is theory of special creation?

(SECTION – II)

- (a) Describe osmoregulation in the animals of marine environment. 4
(b) Describe the biotic components of an ecosystem. 4
- (a) Describe major functions of human skeletal system. 4
(b) Explain Meselson – Stahl experiment for DNA replication. 4
- (a) Describe the functions of abscisic acid as growth hormone in plants. 4
(b) Write down a note on ozone layer and ozone layer depletion. 4
- (a) Write down a note on identical twins and fraternal twins. 4
(b) Discuss diabetes mellitus and its genetic basis. 4
- (a) What are growth correlations? 4
(b) Write down the contributions of Darwin in evolution. 4

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave other blank.

- I. 1. Ozone depletion is commonly caused by:
A) CFCs B) CO₂ C) smoke D) smog
2. A gamete without any sex chromosome is called:
A) heterogamete B) null gamete C) nill gamete D) homogamete
3. Coniferous forests located at high altitude are called:
A) boreal B) tundra C) alpine D) savanna
4. The paired chromosomes repel each other and begin to separate in subphase of meiosis-I is:
A) zygotene B) diakinesis C) diplotene D) pachytene
5. Disease in living organisms caused by parasites is called:
A) parasitism B) infestation C) infection D) predation
6. Separation of homologous chromosomes occurs during:
A) prophase B) metaphase C) anaphase D) telophase
7. Which one is not a vestigial organ of human being?
A) appendix B) coccyx C) nictitating membrane D) eye lid
8. Which one is not a part of limbic system?
A) thalamus B) hypothalamus C) amygdala D) hippocampus
9. Transgenic bacteria are produced in large vats called:
A) transducer B) bioreactor C) biomultiplier D) culter media
10. Tetany is a disease caused by:
A) low calcium in blood B) low vit.D in blood
C) low sugar in blood D) high calcium in blood
11. The phenomena in which transfer of genetic material from one cell to another and can alter the genetic make up of the recipient cell is:
A) translocation B) translation C) transduction D) transformation
12. The inactive non conducting wood is called:
A) primary wood B) secondary wood C) heart wood D) sap wood
13. The negative physiological changes in our body are called:
A) degeneration B) abnormalities C) aging D) regeneration
14. Each cardiac beat supplies _____ of blood to human kidney:
A) 10 % B) 15 % C) 20 % D) 25 %
15. During pregnancy, luteotropic hormone LTH and placental lactogen stimulate Mammary development in preparation for:
A) gestation B) lactation C) after birth D) miscarriage
16. Detection of changes and signalling for effector's response to control system is called:
A) -ive feedback mechanism B) feedback mechanism
C) transformation D) nephridial system
17. Some times partheno carpy is artificially induced for commercial purposes as in tomato, peppers by adding:
A) gibberellins B) cytokinins C) auxins D) ethene

ogy (New Scheme)
 me: 2:40 Hours
 Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.
(SECTION - I)

Paper: II
Marks: 68



(2 × 8 = 16)

2. Write short answers to any EIGHT questions.

- i. Compare Hypotonic environment with hypertonic environment.
- ii. What are "Malpighian Tubules"? In which organism they are found?
- iii. Enlist the three steps in urine formation in human.
- iv. Define secondary growth. Give its significance.
- v. Name the types of turgor movements.
- vi. What is cramp? Give its two causes.
- vii. What are the two goals of the human genome project?
- viii. What are probes? Give its use.
- ix. What are planktons? Give its two types.
- x. Differentiate between coniferous alpine and coniferous boreal forest.
- xi. Name any two diseases which are caused due to nutritional deficiency.
- xii. Define pollution. Give its four types.

3. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- i. What is the main function of parathyroid gland?
- ii. Write down commercial applications of Ethene.
- iii. Define the term effectors. Write down names of two important effectors of humans.
- iv. Define diplohaplontic life cycle in plants.
- v. How you define oviparous and viviparous?
- vi. Define test tube babies.
- vii. What do you know about monohybrid and dihybrid crosses?
- viii. What do you know about "Epistasis"?
- ix. What are "Polygenic Traits"? Give an example from human beings.
- x. How xerophytes differentiate from hydrophytes?
- xi. What is "Prey and Predator"?
- xii. Define the term "Plant Biomass"?

4. Write short answers to any SIX questions.

(2 × 6 = 12)

- i. Differentiate between point mutation and chromosomal aberrations.
- ii. What is the role of RNA polymerase in Transcription?
- iii. Briefly describe Alkaptonuria disease.
- iv. Differentiate between inhibitory and compensatory effect.
- v. What is "Discoidal Cleavage"?
- vi. What changes occur in cell during metaphase of mitosis?
- vii. What is non-disjunction of chromosomes?
- viii. Define homologous organs, give one example.
- ix. Briefly describe, how biogeography provides an evidence for evolution?

(SECTION - II)

- | | | |
|----|---|-----|
| 5. | (a) Explain the process of excretion in Earthworm with labelled diagram. | 2+2 |
| | (b) Describe two major forms of succession. | 4 |
| 6. | (a) Define Antagonism. Discuss the case of Elbow joint with their phenomenon. | 4 |
| | (b) Write a note on Watson and Crick model of DNA. | 4 |
| 7. | (a) What are receptors, discuss their types. | 4 |
| | (b) Discuss "Greenhouse Effect" and "Acid Rain". | 2+2 |
| 8. | (a) Describe human female's menstrual cycle. | 4 |
| | (b) Define epistasis and explain it with Bombay phenotype. | 1+3 |
| 9. | (a) What is "Regeneration"? Discuss it in various animals. | 4 |
| | (b) Describe the main points of theory of natural selection. | 4 |

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.



1. Sunkens stomata are found in which of the following group of plants?
 (A) hydrophytes (B) xerophytes (C) mesophytes (D) bryophytes
2. The fever causing chemical substances in human are
 (A) pathogens (B) poisons (C) pyrogens (D) pyrexia
3. The diameter of skeletal muscle fibres is
 (A) 10 – 80 μm (B) 10 – 100 μm (C) 10 – 120 μm (D) 10 – 135 μm
4. The synovial joint is surrounded by a layer of connective tissue called
 (A) fibrous capsule (B) hyaline cartilage (C) annulus fibrosus (D) hematoma
5. In Honey bees male / drones are haploid and produce sperms by
 (A) oosphere (B) eecsis (C) mitosis (D) meiosis
6. The inner soft wall of the human uterus is called
 (A) ectometrium (B) exome trium (C) endometrium (D) myometrium
7. The division of whole cell is called
 (A) karyokinesis (B) cytokinesis (C) interphase (D) kinetochore
8. The pairing of homologous chromosomes is completed in
 (A) leptotene (B) zygotene (C) pachytene (D) diplotene
9. Which animal has diffused nervous system?
 (A) octopus (B) earthworm (C) planaria (D) jelly fish
10. A plant has a growth pattern called
 (A) open growth (B) growing point (C) meristem (D) apical
11. Highly condensed portions of the chromatin are called
 (A) euchromatin (B) hetero chromatin (C) supercoils (D) centromeres
12. The position of a gene on the chromosome is called
 (A) allele (B) synapse (C) locus (D) linkage
13. How many base pairs are found in the human genome?
 (A) three billion (B) five billion (C) thirty billion (D) forty trillion
14. Which respiratory protein is found in all aerobic species?
 (A) glial cell line (B) cytochrome (C) serine (D) cysteine
15. Energy from sun flows through an ecosystem in the form of
 (A) light (B) radiant heat (C) temperature (D) evaporation
16. The producers in limnetic zone are
 (A) amoebae (B) cyanobacteria (C) hydrilla (D) crustaceans
17. The colour of the pure form of ozone (O_3) is
 (A) whitish (B) yellowish (C) bluish (D) greenish

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

(SECTION - I)**2. Write short answers to any EIGHT questions.**

(2 x 8 = 16)

- Differentiate between hypotonic and hypertonic environments.
- Discuss the process of osmoregulation in mesophytes.
- Differentiate between shivering thermogenesis and non-shivering thermogenesis.
- Elaborate locomotion in star fish.
- Differentiate between plantigrade and digitigrade mammals.
- How locomotion takes place in jelly fish?
- What is diplohaplontic life cycle? Give its types.
- Define parthenocarpy? Give two examples.
- Enlist ecosystems in Pakistan.
- What is human impact on tundra ecosystem?
- Why forests are called environmental buffers?
- Write a note on forest and climate.

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- Name the four types of learning behaviour.
- Give any two characteristics of hormones.
- What is neuroglia? Give its role.
- What is haemophilia? Give its different types.
- Differentiate between autosomes and sex chromosomes.
- Define Mendel's law of segregation.
- What are palindromic segregation?
- What are restriction enzymes?
- Name any four animals declared extinct in Pakistan.
- Differentiate between nitrification and denitrification.
- Distinguish between hydrosere and xerosere.
- Define food chain and food web.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- Differentiate between area opaca and area pellucida.
- What are neoblasts? Give their role.
- Define phenylketonuria.
- Enlist non-sense codon. Give their function.
- What is phosphodiester bond?
- Define cell cycle.
- Define non-disjunction of chromosomes.
- What is endosymbiont hypothesis? Give example.
- Name any four factors affecting gene frequency.

(SECTION - II)

- Describe the mechanism of thermoregulation in mammals.
 - Describe the components of ecosystem.
- Describe locomotion in air.
 - Discuss the experiment of Frederick Griffith (Transformation).
- Compare the nervous system of planaria with hydra.
 - Write a note on greenhouse effect.
- Discuss the human female reproductive cycle.
 - Write a note on incomplete dominance.
- Describe embryonic induction.
 - Describe comparative embryology and fossil record as an evidence of evolution.