

2nd Year Biology Guess Paper 2026 Ruff.pk

Short Questions:

1. What is lithotripsy? (LB-2018)
2. What are pyrogens? (LB-2008, 2013)
3. What is hypertonic environment and what changes occur in a cell in such environment? **(OR)** Differentiate between hypotonic and hypertonic environment. (LB-2010, 2012, 2016)
4. What are osmoconformers and osmoregulators? (LB-2011)
5. What is extracorporeal shock wave lithotripsy? (LB-2014)
6. What are heat shock proteins? (LB-2016)
7. What are flame cells? Give their role. **(OR)** What are flame cells? Why they are called so? (LB-2014)
8. Write structural formula of urea and uric acid. (LB-2010, 2012)
9. Define homeostasis. Give its importance. (LB-2011, 2013)
10. Define anhydrobiosis with an example. (LB-2012, 2014, 2018)
11. Define counter current multiplier mechanism. (LB-2018)
12. Differentiate between poikilotherms and homeotherms. (LB-2012, 2013)
13. Differentiate between ectotherms and endotherms. (LB-2009, 2014)
14. Differentiate between shivering and non-shivering thermogenesis. *Learn Smart. Grow Fast.*
15. Differentiate between hemodialysis and peritoneal dialysis. (LB-2018)
16. Differentiate between xerophytes and mesophytes. **(OR)** What are xerophytes? Give two adaptations of xerophytes. (LB-2012)
17. Draw and label urea cycle. (LB-2018)
18. Explain the process of panting with example.
19. Illustrate the function of Malpighian tubules. (LB-2010)
20. Why leaves are said to be excretophore? (LB-2011)

Long Questions:

1. Write note on osmoregulation in marine fishes. (LB-2014)
2. Write down the structure of a nephron. (LB-2012)
3. Describe the osmoregulation in terrestrial environment. (LB-2011)
4. Discuss excretion in Cockroach. (LB-2016)
5. Describe various kidney problems and their cure in human. **(OR)** Discuss kidney problems in humans. (LB-2008, 2010)
6. Discuss major homeostatic functions of liver. (LB-2018)
7. Explain excretion in plants. **(OR)** Describe the excretion in plants. (LB-2012, 2013, 2014, 2018)

Chapter 16

Short Questions:

1. What is sciatica? **(OR)** What is sciatica and its causes? (LB-2009, 2010, 2016)
2. What is foreman triosseum? **(OR)** What is foreman triosseum? How it is formed? (LB-2010, 2015)
3. What is the role of vascular cambium? (LB-2011, 2012)
4. What is axial skeleton? (LB-2012)
5. What are synovial joints? (LB-2014)
6. What is meant by passive and active flight? **(OR)** Differentiate between active and passive flight. (LB-2012, 2013)
7. What is rickets? Give its causes and cure. **(OR)** How is rickets produced? (LB-2012)
8. What is herniation of discs? **(OR)** Define disc-slip. **(OR)** What are the causes of herniation of discs? (LB-2010, 2011, 2013)
9. What is the difference between tetanus and muscle tetany? (LB-2018)
10. What are the sources of energy for muscle contraction? (LB-2012)
11. What is the difference between exoskeleton and endoskeleton? **(OR)** What is the composition of exoskeleton? (LB-2015)
12. What is the hematoma formation? (LB-2016)
13. What is effective and recovery stroke? **(OR)** Differentiate between effective and recovery stroke. (LB-2016)
14. What are plantigrade and unguigrade? **(OR)** What are plantigrade, digitigrade and unguigrade mammals? (LB-2017)
15. Characterize collenchyma cells. (LB-2011, 2012)
16. Compare phototropism and geotropism. (LB-2017)
17. Compare hinge joint with ball and socket joint. (LB-2012, 2018)
18. Discuss hematoma formation. (LB-2010)
19. Define photonasty and thermonasty. (LB-2016)
20. Define haptonomic movement. (LB-2014)
21. Define antagonistic movement of muscles. (LB-2018)
22. Define ecdysis. **(OR)** What is the process of ecdysis (moulting). (LB-2012)
23. Discuss two main types of cartilage. (LB-2013)
24. Differentiate between sclerenchyma and collenchyma cells. (LB-2013)
25. Differentiate between fibers and sclereids. (LB-2014)
26. Differentiate between compact bone and spongy bone. Give only two differences. (LB-2018)
27. Distinguish between axial skeleton and appendicular skeleton. (LB-2008, 2014)
28. Differentiate between skeletal and smooth muscles. (LB-2012)
29. Differentiate between Osteoporosis and Osteomalacia. (LB-2016)
30. Distinguish between the phototactic and chemotactic movements. **(OR)** What is phototactic movement?
(OR) What is chemotactic movement? (LB-2015)
31. Differentiate between brachialis and brachioradialis.
32. Differentiate between origin and insertion of muscle.
33. Differentiate between bone and cartilage.
34. Differentiate between troponin and tropomyosin.
35. Differentiate between heartwood and sapwood.
36. Differentiate between vessel and tracheids.

37. Differentiate between ligament and tendon. (LB-2018)
38. Explain two types of nastic movements. **(OR)** Compare epinasty and hyponasty. (LB-2012, 2013, 2016)
39. Enlist some of the functions of skeleton. (LB-2015)
40. How callus is formed? (LB-2012)
41. Name the different types of cells associated with bones. (LB-2014)

Long Questions:

1. What are the joints? Describe their types. **(OR)** Define and explain briefly the fibrous, cartilaginous and synovial joints. (LB-2012, 2013)
2. What is endoskeleton? Describe bone and cartilage. (LB-2016)
3. What is Sliding Filament Model of muscle contraction? What does it explain? (LB-2018)
4. Write a note on human appendicular skeleton. (LB-2016)
5. What are the adaptations in birds for flying? (LB-2010)
6. Write down the mechanism of muscle contraction. (LB-2011)
7. Compare the characteristics of smooth, cardiac and skeleton muscles.
8. Describe the significance of secondary growth. (LB-2015)
9. Describe tropic movement in plants. (LB-2014)
10. Describe the adaptations in fishes for locomotion in aquatic environment. (LB-2010)
11. Discuss the arrangement of vertebrae in vertebral column. Also describe rib cage. (LB-2018)
12. Explain about exoskeleton in Arthropods. (LB-2012)
13. Explain the role of Calcium ions in the process of Sliding Filament Model. (LB-2010)
14. Give an account of paratonic movement in plants. (LB-2015)
15. How is energy provided for muscle contraction? (LB-2012)

Chapter 17

Short Questions:

1. What is innate behavior? (LB-2016)
2. What is the role of hypothalamus? (LB-2016)
3. What is synapse? (LB-2011)
4. What is habituation? Give an example. (LB-2013)
5. What is the role of thyroxine?
6. What is the role of vasopressin/ADH and oxytocin hormone?
7. What is the function of estrogen and progesterone?
8. What is the commercial application of cytokinins? (LB-2016)
9. What are androgens?
10. What are sensory neurons? (LB-2016)
11. What are axons and dendrites? **(OR)** How axon differ from dendrites. (LB-2009, 2010, 2014)
12. What is reflex arc? **(OR)** Differentiate between reflex action and reflex arc. (LB-2012, 2014, 2018)
13. What are the symptoms of Alzheimer's disease? (LB-2013)
14. What is the difference between CNS and PNS? (LB-2012, 2016)
15. What is the function of parathyroid gland or parathormone? (LB-2008, 2013, 2016)
16. What is Parkinson's disease? **(OR)** Differentiate between Parkinson's and Epilepsy. (LB-2009, 2012, 2018)

17. What is neuroglia?
18. What are Nissl's granules? **(OR)** What are neuroglia and Nissl's granules?
19. What are gastrin and secretin? **(OR)** Give the functions of secretin and gastrin. **(OR)** Name the two hormones of gut. (LB-2010, 2013)
20. Write function of photoreceptors and nociceptors. (LB-2014)
21. Compare Circadian and Circannual rhythms.
22. Define saltatory impulse. **(OR)** Define saltatory impulse and synapse. (LB-2001, 2011)
23. Define the term hormone, give one example? (LB-2012)
24. Define feedback mechanism. (LB-2018)
25. Differentiate between biorhythms and diurnal rhythms. (LB-2014)
26. Differentiate between etiolation and chlorosis. **(OR)** What is chlorosis? (LB-2018)
27. Differentiate between callus and galls.
28. Differentiate between sympathetic and parasympathetic nervous system.
29. Differentiate between active and resting membrane potential. (LB-2018)
30. Give role of 2, 4 Dichlorophenoxyacetic Acid. (LB-2014)
31. Give two commercial applications of Gibberellins. (LB-2011, 2014, 2018)
32. Name and define different types of tropisms. (LB-2008)
33. Give effects of nicotine on blood vascular system and digestive system in man. **(OR)** What is the action of nicotine on coordination? (LB-2011-2015)
34. Explain the functions of two hormones secreted by Islets of Langerhans. **(OR)** What is the role of insulin and glucagon in the body? (LB- 2013)
35. Explain imprinting? (LB-2010, 2012)

Long Questions:

8. What are receptors? Describe their different types. (LB-2016)
9. Write a note of thyroid gland?
10. Write a note on adrenal glands? **(OR)** Describe in detail the role of adrenal glands (LB-2015)
11. Write any four differences between nervous and chemical coordination. (LB-2018)
12. Write a brief note on conditioned reflex type I. (LB-2011)
13. Define and explain feedback mechanism?
14. Define and explain nerve impulse. **(OR)** Describe initiation of nerve impulse. (LB-2014)
15. Describe the role of auxins. (LB-2012)
16. Describe the role and commercial application of Gibberellins. (LB-2010)
17. Describe the role of Abscisic Acid and Ethane in plant growth. (LB-2013)
18. Discuss peripheral nervous system in man. (LB-2018)
19. Discuss the nervous system of *Hydra*. **(OR)** Compare the nervous system of *Hydra* and *Planaria*. **(OR)** Nervous system of *Hydra* is better developed than of *Planaria*. Discuss. (LB-2012, 2013, 2016)

Chapter 18

Short questions:

1. What is follicle atresia?
2. What is after birth?
3. What is the role of placenta in human? (LB-2008)
4. What is seed dormancy? Give its importance. (LB-2014)

5. What is the role of interstitial cells in sperm production? (LB-2012)
6. What is the structure and function of corpus luteum? (LB-2013)
7. What is parthenocarpy? **(OR)** Define parthenocarpy with examples. **(OR)** How does parthenocarpy differ from parthenogenesis? (LB-2010, 2011, 2013)
8. Write down at least two important measures to prevent AIDS. (LB-2013)
9. What are Oviparous, Viviparous and Ovoviviparous animals? **(OR)** Give difference between Oviparous and Viviparous animals. **(OR)** What are Ovoviviparous animals? Give examples. **(OR)** Differentiate between oviparity and viviparity. (LB-2008, 2009, 2012, 2013)
10. Classify the plants according to photoperiodic requirement for flowering. **(OR)** Name types of plants according to photoperiodism. (LB-2013, 2015)
11. Compare sexual and asexual reproduction. (LB-2015)
12. Define photoperiodism and write its effects in plants. **(OR)** Give importance of photoperiodism in plants. (LB-2011, 2016)
13. Define apomixes. **(OR)** What is meant by apomixes? **(OR)** What is apomixes (LB-2014, 2018)
14. Define vernalization. **(OR)** What is vernalization? (LB-2012, 2018)
15. Differentiate between haploid parthenogenesis and diploid parthenogenesis. **(OR)** Define diploid parthenogenesis. **(OR)** Define diploid parthenogenesis. Give an example. (LB-2012)
16. Differentiate between menopause and ovulation. **(OR)** Explain menopause and after birth. (LB-2012)
17. Differentiate between internal and external fertilization. (LB-2018)
18. Differentiate between spermatogenesis and oogenesis. (LB-2009)
19. Differentiate between identical twins and fraternal twins. **(OR)** How identical twins and fraternal twins are produced? (LB-2010, 2013)
20. How can you differentiate between menstrual cycle and oestrous cycle? **(OR)** Define/ Explain oestrous cycle. (LB-2014)
21. How lactation differ from gestation? (LB-2010)
22. How test tube babies are produced? **(OR)** What are test tube babies (LB-2009, 2014)

Long questions:

1. Write a note on test tube babies. (LB-2016)
2. Compare asexual reproduction with sexual reproduction. **(OR)** Give a comprehensive comparison between asexual and sexual reproduction. (LB-2012, 2015)
3. Give an account of Sexually Transmitted Diseases in man. **(OR)** Explain Sexually Transmitted Diseases with the help of examples. **(OR)** Explain Sexually Transmitted Diseases in humans. (LB-2014, 2016, 2017)
4. Describe the reproductive system of human female. **(OR)** Describe human female reproductive system. (LB-2015)
5. Describe the reproductive system of male.
6. Explain reproductive or menstrual cycle of human female. **(OR)** Describe the steps of menstrual cycle in human female. (LB-2011)
7. Explain the process of birth in human beings. **(OR)** Describe the birth in man. (LB-2013)
8. Explain the role of phytochrome in photoperiodism. **(OR)** Define and explain photoperiodism. (LB-2014, 2016)

Chapter 19

Short questions:

1. What do you mean by open growth? (LB-2011, 2012)
2. What is blastoderm?
3. What is cleft palate?
4. What is microcephaly?
5. What is neurula? **(OR)** What is neurocoel? (LB-2015)
6. What is present goal of gerontology? (LB-2010)
7. What is gastrocoel and from which germ layer it is originated? (LB-2013)
8. What is Henson's node? Give its role. (LB-2012)
9. What is meant by discoidal cleavage? (LB-2016)
10. What is meristem? **(OR)** Define meristem. Name its types based on position. **(OR)** Describe various types of meristems. **(OR)** What is apical meristem? **(OR)** What are intercalary meristems. Give their role. **(OR)** What do you mean by lateral meristem. (LB-2013, 2015, 2016, 2017, 2018)
11. What is the difference between epiblast and hypoblast? (LB-2017)
12. What is the difference between inhibitory effect and compensatory effect?
13. Write down the names of different kinds of cytoplasm's with their functions.
14. Briefly describe the external and internal factors that affect growth in plants. (LB-2009)
15. Define aging and write its symptoms. **(OR)** Give symptoms of aging. **(OR)** What are important signs of aging in human beings? **(OR)** What are the causes of aging and how aging can be slowed down? (LB-2014)
16. Define gastrulation in chick. (LB-2013)
17. Define growth correlations. (LB-2018)
18. Define neurocoel, blastocoel and gastrocoel.
19. Define organizer and inducer substance. **(OR)** What are primary organizer and inducer substances? (LB-2009, 2013)
20. Define regeneration with examples. (LB-2011)
21. Define teratology and teratogens? **(OR)** Define teratology. (LB-2018)
22. Differentiate between area pellucida and area opacca.
23. Differentiate between gerontology and teratology. (LB-2010)
24. Differentiate between growth and development. **(OR)** Define growth. (LB-2010, 2016, 2017)
25. Differentiate between morula and blastula.
26. Differentiate between primary and secondary growth. (LB-2018)
27. Give the name of the two sheets like layers into which mesoderm splits and name the cavity formed between these. **(OR)** Differentiate between somatic and splanchnic mesoderm. (LB-2012, 2013)
28. How do final size of cells of cortex and tracheids is attained in zone of maturation? (LB-2013)
29. How notochord is formed in chick embryo? (LB-2011)
30. How primitive streak is formed? (LB-2008)
31. State dedifferentiation of cells. (LB-2012)
32. State the role of gray vegetal and grey equatorial cytoplasm. (LB-2012)

Long questions:

1. Write a note on Neurulation in Chick. (LB-2012)
2. Write detailed note on regeneration. **(OR)** Define and explain regeneration. (LB-2016)
3. What is growth? Discuss different phases of growth in plants. **(OR)** Discuss different phases of plant growth. (LB-2014)

4. What is aging? Explain its process. **(OR)** Define and explain aging. **(OR)** What is aging? How would you explain this process? **(OR)** What is aging? Describe its causes and symptoms. (LB-2013, 2015, 2016, 2017, 2018)
5. Define abnormal development. Explain different factors causing abnormalities. **(OR)** Write a note on abnormal development. (LB-2013, 2014)
6. Describe the phenomenon of growth correlation. (LB-2018)
7. Explain the role of nucleus in development. **(OR)** Describe the role of nucleus in development. (LB-2010, 2017)

Chapter 20

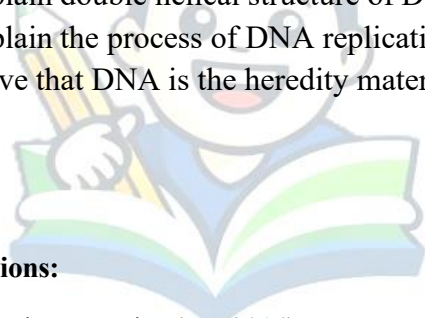
Short questions:

1. What is semi-conservative replication of DNA? (LB-2015)
2. What is sickle cell anemia? (LB-2016)
3. What is transformation? (LB-2011, 2016)
4. What is translation? (LB-2014, 2015)
5. What are mutagens? Give one example. (LB-2018)
6. What are the contributions of P.A. Levene for determining the structure of DNA? (LB-2017)
7. What is alkaptonuria? **(OR)** What is phenylketonuria? **(OR)** Differentiate between alkaptonuria and phenylketonuria.
8. What is central dogma? (LB-2018)
9. What is genetic code? **(OR)** What are non-sense codons? **(OR)** Enlist non-sense codons and their function. **(OR)**
10. Where codon and anticodon are situated? (LB-2012, 2014, 2018)
11. What is heterochromatin? **(OR)** What is euchromatin? **(OR)** Differentiate between heterochromatin and euchromatin. (LB-2016, 2018)
12. What is mutation? **(OR)** What do you mean by mutations? **(OR)** Define mutation and differentiate between chromosomal aberration and point mutation. (LB-2010, 2013, 2017)
13. What is phosphodiester linkage? Draw structural formula. **(OR)** What is phosphodiester bond or linkage? (LB-2013, 2015, 2016)
14. Compare replication, transcription and translation.
15. Define chromosomal theory of inheritance. (LB-2010, 2014)
16. Define karyotype. **(OR)** What is karyotype? **(OR)** What do you mean by karyotype? Give its significance. (LB-2014)
17. Define nucleosome. (LB-2012)
18. Define nucleotide and nucleoside. (LB-2017)
19. Define one gene/one polypeptide hypothesis? (LB-2017)
20. Define point mutation. **(OR)** State point mutation with examples. **(OR)** Define point mutations. Give one example. (LB-2012, 2014, 2018)
21. Define transcription and how it is initiated? **(OR)** What is the function of RNA polymerase in transcription? (LB-2010, 2013)
22. Differentiate among conservative, semi-conservative and dispersive replication of DNA.
23. Differentiate between leading and lagging strand.
24. Differentiate between sense and anti-sense strands of DNA. (LB-2018)
25. Differentiate between rough and smooth type of bacteria. (LB-2017)
26. Enlist different shapes of chromosome. (LB-2012)

27. Give the length of Okazaki fragment. **(OR)** What are Okazaki fragments? (LB-2015, 2016)
28. Give the role and kinds of tRNA. (LB-2013)
29. How many types of DNA polymerases are found, write down their names? (LB-2017)

Long questions:

1. What are chromosomes? What do you know about their number, karyotype, types and shapes? **(OR)** Describe types of chromosomes on the basis of centromere. (LB-2015, 2017)
2. What is genetic code? Describe its characteristics. (LB-2014)
3. Define and explain transcription in detail. **(OR)** What is transcription? How it occurs?
4. Define and explain translation.
5. Describe how Hershey and Chase prove that DNA is hereditary material. (LB-2013)
6. Describe Watson-Crick Model of DNA in detail. (LB-2013, 2014)
7. Describe process of translation. (LB-2010)
8. Describe one gene/one polypeptide hypothesis considering the work of Beadle and Tatum. **(OR)** What hypothesis did Beadle and Tatum test in their experiment on *Neurospora*. (LB-2012, 2018)
9. Explain Meselson and Stahl's experiment. **(OR)** Describe Meselson and Stahl's experiment to show semi-conservative replication. (LB-2011, 2012, 2015)
10. Explain double helical structure of DNA. (LB-2014)
11. Explain the process of DNA replication with the help of diagram. (LB-2018)
12. Prove that DNA is the heredity material. (LB-2017)



Chapter 21

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Short questions:

30. What is Necrosis? (LB-2014)
31. What is tumor? (LB-2014)
32. What is Klinefelter's syndrome? (LB-2016)
33. What is metastasis? (LB-2016)
34. What is the importance of bivalent formation? (LB-2012)
35. What happens during metaphase I? (LB-2013)
36. What are mutagens? Give one example. (LB-2018)
37. What are the apparent symptoms or effects of Down's syndrome? **(OR)** What is Down's syndrome? **(OR)** Describe causes and symptoms of Down's syndrome. **(OR)** Write symptoms of Down's syndrome. (LB-2014, 2018)
38. What are the symptoms of Turner's syndrome? **(OR)** How Turner's syndrome is caused and give its features. **(OR)** What is Turner's syndrome? (LB-2013, 2014)
39. What is Apoptosis? **(OR)** Differentiate between Necrosis and Apoptosis. **(OR)** How cell death (Apoptosis) is beneficial for organisms? (LB-2014)
40. What is mitotic apparatus? **(OR)** What is mitotic apparatus? Give its functions. (LB-2013, 2016, 2018)
41. Define cell cycle. (LB-2015)
42. Define non-disjunction. **(OR)** What is non-disjunction or meiotic errors? **(OR)** What do you mean by non-disjunction? (LB-2017)

43. Define karyokinesis and cytokinesis. **(OR)** How do karyokinesis and cytokinesis phases of cell division differ? (LB-2014)
44. Define meiosis and mitosis. **(OR)** What is the importance of mitosis and meiosis? (LB-2017)
45. Differentiate between benign and malignant tumor.
46. Differentiate between G₀-phase and S-phase of interphase. **(OR)** Differentiate between interphase and mitotic phase. **(OR)** Describe changes occur during G₁-phase. (LB-2011, 2012, 2016)
47. Give events of Zygotene. (LB-2013)
48. Give two main importance of meiosis. (LB-2013)
49. How can you identify Cancer cells? **(OR)** Cancer is uncontrolled cell division, explain. (LB-2011)
50. In what respects does mitosis in plant cells differ from that in animal cells? **(OR)** Explain cytokinesis in plants. **(OR)** How cytokinesis occur in plants? (LB-2010, 2018)
51. Sketch and label cell cycle. (LB-2010)

Long questions:

1. Write about Necrosis and Apoptosis. (LB-2012)
2. Define non-disjunction and discuss its effect with one example. (LB-2013)
3. Explain about interphase of cell cycle. (LB-2013)
4. Explain the stages of prophase I of meiosis I. (LB-2010, 2012)

Short questions:

1. What is Bombay phenotype? (LB-2016, 2017)
2. What is MODY? (LB-2008, 2015, 2016)
3. What is SRY gene? How it is transferred? (LB-2011)
4. What are the genes and alleles? (LB-2016)
5. What is a nullo gamete?
6. What do you know about hypophosphatemic rickets?
7. What is testicular feminization syndrome?
8. What are pseudoautosomal genes?
9. What is haemophilia and its various types? **(OR)** What is haemophilia?
10. What is the role of blood groups in establishing parentage? (LB-2010)
11. What is meant by universal blood donor and universal recipient?
12. What are X-linked and Y-linked genes? Give one example of both.
13. What is crossing over? What is its importance? (LB-2013)
14. What is bean-bag genetics? **(OR)** What is a gene pool? **(OR)** Differentiate between gene and gene pool. (LB-2014)
15. What is meant by erythroblastosis foetalis? **(OR)** Why erythroblastosis foetalis is called so? **(OR)** How does ABO incompatibility protect the developing baby against Rh- incompatibility? (LB-2011, 2012)
16. What is meant by linkage, linked genes and linkage groups? **(OR)** What is a linkage group? **(OR)** Define linkage group by giving example. **(OR)** What are linkage groups? Give their number in human beings. **(OR)** Define gene linkage and gene linkage groups (LB-2012, 2013, 2015, 2018)
17. What is test cross? Why did Mendel suggest this cross? **(OR)** Give the significance of test cross. **(OR)** What is test cross? Give its uses. (LB-2011, 2012, 2013, 2018)

Chapter 22

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18. What is the difference between heterogametic and homogametic individuals? **(OR)** What is heterogametic individual? Give example. (LB-2018)
19. What are compound sex chromosomes and their example? (LB-2013)
20. Compare monohybrids with dihybrids. (LB-2014)
21. Define laws of Mendel. **(OR)** Define Mendel's law of segregation (law of purity of gametes). **(OR)** Define law of segregation. (LB-2015, 2018)
22. Differentiate between phenotype and genotype. **(OR)** What is the difference between phenotype and genotype? (LB-2014)
23. Differentiate between incomplete dominance and co-dominance. (LB-2012)
24. Differentiate between autosomes and sex-chromosomes. (LB-2011)
25. Differentiate between gene and genome.
26. Differentiate between homozygous and hemizygous.
27. Differentiate between homozygous and heterozygous. (LB-2011, 2014, 2016)
28. Differentiate between dominant trait and recessive trait.
29. Differentiate between qualitative and quantitative traits.
30. Differentiate between X-linked and Y-linked traits.
31. Differentiate between X-linked and Y-linked genes.
32. Differentiate between X-linked dominant and X-linked recessive traits.
33. Differentiate between IDDM and NIDDM.
34. Differentiate between multifactorial and polygenic traits.
35. Differentiate between probability and product rule. (LB-2008)
36. Differentiate between protanopia, deuteranopia and tritanopia.
37. Differentiate between allele and multiple alleles? **(OR)** What are multiple alleles? Give example. (LB-2014)
38. Differentiate between dominance and epistasis. **(OR)** What is epistasis? How it differs from dominance? (LB-2010, 2012, 2018)
39. Differentiate between sex-limited and sex-influenced traits. **(OR)** What are sex-limited traits? **(OR)** What are sex-influenced traits? **(OR)** What is the sex-limited traits? Give an example. (LB-2008, 2009, 2013, 2017, 2018)
40. Distinguish between polygenes and pleiotropy. **(OR)** Define pleiotropy. **(OR)** What is pleiotropy and its example? (LB-2013)
41. Give the concept of fixed allele. (LB-2012)
42. How sex determination occurs in yeast? (LB-2017)
43. The value of parental combination of two linked gene AB and ab is 40, 40 and of recombinant gene Ab and aB is 10, 10 respectively. Find recombination frequency. (LB-2010)

Long questions:

1. What is epistasis? Explain it with an example of Bombay phenotype. (LB-2013)
2. What is incomplete dominance? Explain it with an example. (LB-2012, 2013)
3. Define and explain multiple alleles. **(OR)** Describe multiple allelic blood group system of man. **(OR)** Discuss the genetics of ABO blood group system. **(OR)** Explain the ABO blood group system. (LB-2012, 2018)
4. Define and explain sex-linkage in *Drosophila*. (LB-2015)

5. Describe Mendel's law of segregation (law of purity of gametes) **(OR)** Define Mendel's law of segregation. Explain it with one example. **(OR)** What is Mendel's law of segregation? Illustrate it with an example (LB-2011, 2016)
6. Define Mendel's law of Independent Assortment. Explain it with an example.
7. Discuss sex-linkage in humans with one example. (LB-2018)
8. Discuss the genetics of color-blindness. **(OR)** Describe the genetics of color-blindness in humans. (LB-2014, 2016)
9. Explain in detail diabetes mellitus and its types. (LB-2017)
10. Explain different patterns of sex determination. **(OR)** Explain different patterns of sex determination in animals (LB-2010, 2014, 2015)

Chapter 23

Short questions:

1. What is a probe? (LB-2014)
2. What is gene pharming? (LB-2018)
3. What is aspartame?
4. What is gene therapy?
5. What is cystic fibrosis?
6. What are clonal plants? (LB-2011)
7. What is meant by cloning? (LB-2010)
8. What are Palindromic sequences? (LB-2013, 2016, 2018)
9. What are the various methods of gene or DNA sequencing? (LB-2016)
10. What are the two goals of Human Genome Project? (LB-2016, 2018)
11. What is the biodegradable plastic and its origin? (LB-2013)
12. What is SCID? **(OR)** Differentiate between cystic fibrosis and SCID.
13. What is the role of suicide gene in transgenic bacteria? (LB-2013)
14. What is the advantage of genetic engineering of C4 plants?
15. What are transgenic plants. **(OR)** Give two advantages of transgenic plants. (LB-2011, 2014, 2015)
16. What is Ex-vivo gene therapy? **(OR)** Differentiate between Ex-vivo and In-vivo gene therapy. (LB-2016, 2017)
17. What is a genome and genomic library? **(OR)** Differentiate between genome and genomic library. **(OR)** Define genomic library. (LB-2016, 2018)
18. What is PCR and write applications of PCR amplification. **(OR)** What are the uses of PCR amplification and analysis? (LB-2013)
19. What is totipotency? **(OR)** What is totipotent cell? **(OR)** Define the term totipotent. **(OR)** Why plant cells are said to be totipotent? (LB-2014, 2017)
20. Define biotechnology. Give its application. (LB-2016)
21. Define Molecular scissors. **(OR)** What are restriction enzymes? Give example. **(OR)** Differentiate between molecular scissors and molecular vectors? (LB-2009, 2018)
22. What is the role of molecular carrier-the vector? **(OR)** Differentiate between plasmids pSC 101 and pBR 322? **(OR)** Elaborate the use of plasmids. **(OR)** Mention the role of lambda phage during recombinant DNA technology. (LB-2012, 2013, 2014, 2017)
23. Explain the importance of gene sequencing. (LB-2010)

Long questions:

1. Write a note on tissue culture technique? (LB-2013)
2. Write a note on tissue culture and cloning. (LB-2018)

Chapter 24

Short questions:

1. What is genetic drift? (LB-2010, 2011, 2012)
2. What are hydrothermal vents? How do they support life?
3. What is modern synthesis/ Neo-Darwinism? **(OR)** Give the concept of Neo-Darwinism. (LB-2012, 2014)
4. Write the name of theories of evolution presented by Lamarck and Darwin. (LB-2011)
5. What are vestigial organs? Name some important vestigial organs of man. **(OR)** What are vestigial organs? Give one example (LB-2010, 2012, 2014, 2018)
6. Define the term Neo-Darwinism. (LB-2018)
7. Define fossil. Where are most of the fossils found? (LB-2014)
8. Define endosymbiont hypothesis.
9. Define endangered species. **(OR)** What are endangered species? Give examples. **(OR)** Differentiate between endangered and threatened species. (LB-2018)
10. Define Hardy Weinberg Theorem and give its equation in the form of binomial expansion. (LB-2013)
11. Differentiate between homology and analogy. (LB-2013)
12. Differentiate between homologous and analogous organs. **(OR)** Define homologous organs by giving examples (LB-2011, 2012)
13. Name any four factors affecting gene frequency. (LB-2013)
14. State/define theory of special creation. (LB-2014)

Long questions:

1. How comparative embryology support the process of evolution. **(OR)** Describe comparative embryology and molecular biology as an evidence of evolution. (LB-2018)
2. Describe evidence of evolution by comparative anatomy. (LB-2014, 2018)
3. Describe the evidences of evolution from Biogeography and fossil record. (LB-2008)
4. Discuss evolution from prokaryotes to eukaryotes. (LB-2011)
5. Explain Hardy Weinberg Theorem?
6. Explain the Theory of Inheritance of Acquired Characteristics. (LB-2010)
7. State different factors affecting the gene frequency. (LB-2012)

Chapter 25

Short questions:

1. What is ammonification? (LB-2010)
2. What are root nodules? (LB-2017)
3. What is assimilation? (LB-2014)
4. What is a Mycorrhiza? **(OR)** What are Mycorrhizae? (LB-2009, 2011)
5. What are lichens? (LB-2008)

6. What is grazing? How grazing affect the texture of soil? **(OR)** Define grazing. How grazers affect the ecosystem? (LB-2008, 2010)
7. What is biome? **(OR)** Differentiate between biome and biosphere?
8. Briefly write about secondary succession. (LB-2012)
9. Define predation. **(OR)** Give the significance of predation. (LB-2012, 2016)
10. Define succession and name its types. (LB-2014)
11. Define biogeochemical cycles. **(OR)** What are biogeochemical cycles? (LB-2012)
12. Define productivity of an ecosystem and differentiate between gross primary production and net primary production. (LB-2008)
13. Define ecosystem. Write its components. **(OR)** Define ecosystem. (LB-2012, 2016)
14. Define biosphere. **(OR)** What is biosphere. **(OR)** Define biosphere and ecosystem. (LB-2014, 2015, 2018)
15. Define and describe biotic components of an ecosystem. (LB-2014)
16. Define parasitism. Give its significance. **(OR)** Differentiate between predation and parasitism. (LB-2009, 2012)
17. Define commensalism. Give one example. **(OR)** Define commensalism with the help of an example. (LB-2013, 2018)
18. Define food chain and food web. **(OR)** Define food chain by giving an example. (LB-2010, 2012, 2013, 2015)
19. Differentiate between population and community. (LB-2014)
20. Differentiate between habitat and niche. **(OR)** Define niche. **(OR)** Explain ecological niche. (LB-2011, 2012, 2013)
21. Differentiate between autecology and synecology. **(OR)** What is synecology? **(OR)** What is autecology? (LB-2011, 2013, 2018)
22. Differentiate between micro and macro nutrients? (LB-2010)
23. Differentiate between consumers and decomposers. **(OR)** What are consumers? (LB-2014)
24. Differentiate between hydrosere and xerosere. (LB-2015, 2017)
25. Differentiate between primary and secondary succession. **(OR)** How primary succession differ from secondary succession? (LB-2012, 2017)
26. Name some ways of nitrogen depletion from soil and its remedy.

Long questions:

1. Write a note on grazing. (LB-2014)
2. Write a note on nitrogen cycle. (LB-2011, 2012, 2015, 2016)
3. Define succession. Explain the different stages of xerosere. **(OR)** Explain the stages of xerosere. **(OR)** Describe different stages of succession in xerosere. (LB-2014, 2018)
4. Define the following terms i) Habitat ii) Niche iii) Food Web iv) Succession
5. Discuss the flow of energy in food chain of an ecosystem. (LB-2018)
6. Explain the biotic component of an ecosystem. (LB-2012)

Chapter 26

Short questions:

1. What is the composition of air of terrestrial ecosystem? (LB-2012)
2. What is the effect of human impact on Tundra ecosystem? (LB-2013)
3. What is the effect of human impact on Desert ecosystem? (LB-2010)
4. Where the Desert ecosystem is found in Pakistan. (LB-2018)
5. What is the range of rainfall and temperature in Temperate Deciduous Forest **(OR)** Discuss animal life of temperate deciduous forest? (LB-2012)
6. What are the four major requirements for life? **(OR)** Which two are limiting factors in terrestrial ecosystem?
7. What is meant by layering in a grassland ecosystem? **(OR)** Give the layering characteristics of grassland. (LB-2013)
8. What is profundal zone? Give its one character. **(OR)** What type of organisms are present in profundal zone of lake? (LB-2018)
9. Define productivity of an ecosystem.
10. Differentiate between climate and weather. **(OR)** What is climate?
11. Differentiate between thal and thar.
12. Differentiate between Alpine and Boreal forests. (LB-2009, 2018)
13. Differentiate between Zooplankton and Phytoplankton. (LB-2008, 2011)
14. Differentiate between Prairies and Savanna.
15. Differentiate among littoral, limnetic and profundal zone. **(OR)** Characterize littoral zone of fresh water lakes. **(OR)** What is limnetic zone mention its life. (LB-2013, 2014)
16. Describe animal life of Grassland ecosystem. (LB-2012)
17. Enlist two adaptations in plants and two in animals for a terrestrial ecosystem. **(OR)** Give two adaptations of terrestrial ecosystem. (LB-2010, 2012)
18. Give the name of some major ecosystems on land in Pakistan.
19. Give location of Tundra ecosystem in Pakistan. (LB-2014)
20. Name six major terrestrial biomes.
21. Mention the characteristics of plant life in desert ecosystem. (LB-2013)

Long question:

1. Write a note on Tundra ecosystem. (LB-2013)
2. Give an account of desert ecosystem. (LB-2008)

Chapter 27

Short questions:

1. What is acid rain? (LB-2013)
2. What is Eutrophication? **(OR)** What is algal bloom? (LB-2015)
3. What is Ozone? **(OR)** Give the importance of ozone layer. (LB-2017)
4. What are pollutants?
5. Write names of various types of pollution. (LB-2011)
6. What are the main sources of water pollution? **(OR)** Give main causes of water pollution. (LB-2012, 2015)

7. Write the causes and effects of ozone depletion? **(OR)** Give the effects of ozone depletion on life. (LB-2012)
8. What are solid wastes and how these can be used as source of energy? **(OR)** Give importance of solid waste.
9. What do you mean by non-renewable resources? **(OR)** What are renewable resources. Give examples. **(OR)** Differentiate between renewable and non-renewable resources. (LB- 2011, 2013, 2014, 2016, 2018)
10. What measures should be taken for conservation of energy? **(OR)** How we can save energy? Mention any four ways in which we can save energy. **(OR)** Write four ways of energy conservation? (LB-2014, 2017)
11. What is deforestation? **(OR)** What is afforestation? **(OR)** What is reforestation? **(OR)** What is the difference between deforestation and afforestation? **(OR)** Differentiate between afforestation and reforestation. **(OR)** What is the difference among deforestation, afforestation and reforestation? (LB-2014, 2015)
12. Define greenhouse effect.
13. Describe abuses of land. (LB-2012)
14. Define soil and give its basic constituents. **(OR)** What is soil? **(OR)** What is soil? Give its basic constituents. (LB-2016, 2018)
15. Differentiate between health and disease.
16. Discuss importance of forests.
17. Differentiate between Population Explosion and Population Pressure. **(OR)** Enlist some reasons of Population Explosion in the world also describe Population Pressure. **(OR)** Write the reasons of world Population Explosion. **(OR)** What do you mean by Population Explosion and give its two causes? (LB-2010,2013,2014)
18. How is air important to life as a source? (LB-2012)
19. Give uses and misuses of agrochemicals.
20. Name two pathogenic and two congenital diseases. (LB-2018)
21. Why trees are called environmental buffers? **(OR)** Define environmental buffers.

Long questions:

1. Write a note on greenhouse effect. (LB-2011)
2. Write a note on acid rain.
3. Write a note on deforestation and afforestation. (OR) Describe deforestation. (LB-2013, 2018)
4. Write a note on ozone layer depletion. (LB- 2012)
5. What are Renewable Resources? Explain any two of them.
6. What is pollution? Explain the phenomenon of air pollution. (LB-2017)
7. Write a note on wild life? (OR) Describe wild life as renewable resources (LB-2014, 2018)
8. Discuss importance of forests. (LB-2017)
9. Explain the phenomenon of eutrophication.