JHARKHAND Rai University RANCHI

PRACTICE SET

End Semester (I Sem.) Examination, Dec 2025

Course: Biological Science for Engineers
Semester: III
Program: B.Tech
Course Code: 3BSC202

Course Outcomes	Description
CO1	Ability to understand the basic electric circuits
CO2	Ability to analyse DC and AC circuits
CO3	Ability to understand the characteristics and applications of Diode and Transistors
CO4	Ability to analyse basic transistor and opamp based circuits.

Section A **(41 of Question x 5= 205)**

1. Define biology. Write down the significance of biology in scientific discipline as Mathematics, Physics and Chemistry. [CO1] [Unit-I] [Remember] [LOT]

2. Explain Brownian motion. [CO1] [Unit-I] [Understand] [LOT]

3. What are autotrophs and heterotrophs? [CO2] [Unit-II] [Remember] [LOT]

4. Write a short note in taxonomy. [CO2] [Unit-II] [Remember] [LOT]

5. Describe the three domains (kingdoms) of life. [CO2] [Unit-II] [Remember] [LOT]

6. Describe model organisms. Name any three. [CO2] [Unit-II] [Remember] [LOT]

7. Write a short note on a prokaryotic cell. [CO2] [Unit-II] [Remember] [LOT]

8. Compare characteristics of prokaryotic and eukaryotic cells. [CO2] [Unit-II] [Understand] [LOT]

9. What is the cell cycle? [CO3] [Unit-III] [Remember] [LOT]

10. Write a short note on meiosis. [CO3] [Unit-III] [Remember] [LOT]

11. State Mendel's laws. [CO3] [Unit-III] [Remember] [LOT]

12. Give an account of dominant and recessive genes.[CO3] [Unit-III] [Understand] [LOT]

13. Write a short note on gene mapping. [CO3] [Unit-III] [Remember] [LOT]

14. Describe complementary gene interaction. [CO3] [Unit-III] [Understand] [LOT]

15. Write a short note on phenotype. [CO3] [Unit-III] [Remember] [LOT]

16. Explain Down's syndrome. [CO3] [Unit-III] [Remember] [LOT]

17. List functions of proteins. [CO4] [Unit-IV] [Remember] [LOT]

18. Describe polysaccharides. Write down the function of it. [CO4] [Unit-IV] [Remember] [LOT]

19. Write down classification of nucleic acids and a function of each. [CO4] [Unit-IV] [Remember] [LOT]

20. Illustrate different kind of amino acids with suitable example. [CO4] [Unit-IV] [Understand] [LOT]

21. Write a short note on macromolecules. [CO4] [Unit-IV] [Remember] [LOT]

22. Define enzymes. Write down the functions of enzyme. [CO5] [Unit-V] [Remember] [LOT]

23. State the role of catalysts in biological reactions. [CO5] [Unit-V] [Understand] [LOT]

24. Distinguish between DNA and RNA. [CO6] [Unit-VI] [Understand] [LOT]

25. Briefly describe genetic code.[CO6] [Unit-VI] [Understand] [LOT]

26. Write a short note on complementation. [CO6] [Unit-VI] [Understand] [LOT]

27. Explain gene recombination. [CO6] [Unit-VI] [Remember] [LOT]

28. Write a short note on protein. [CO7] [Unit-VII] [Remember] [LOT]

29. Describe free energy. [CO8] [Unit-VIII] [Understand] [LOT]

30. Explain the concept of energy charge. [CO8] [Unit-VIII] [Understand] [LOT]

31. Write a short note on metabolism. [CO8] [Unit-VIII] [Remember] [LOT]

32. What is a microorganism? Classify it with suitable example. [CO9] [Unit-IX] [Remember] [LOT]

33. Describe different types of microscopy technique. [CO9] [Unit-IX] [Remember] [LOT]

34. Define different sterilization technique. [CO9] [Unit-IX] [Remember] [LOT]

35. List ecological aspects of single-celled organisms. [CO9] [Unit-IX] [Remember] [LOT]

36. Describe growth kinetics. [CO9] [Unit-IX] [Remember] [LOT]

37. Write down two energy-yielding and energy-consuming reactions. [CO8] [Unit-VIII] [Understand] [LOT]

38. Define lipids. List functions of lipids. [CO4] [Unit-IV] [Remember] [LOT]

39. Write down the name of the purines and pyrimidines base in DNA. Describe the significance of its. [CO6] [Unit-VI] [Remember] [LOT]

40. Define tRNA. Write down the function of tRNA. [CO6] [Unit-VI] [Understand] [LOT]

41. List characteristics of aquatic and terrestrial habitats. [CO2] [Unit-II] [Remember] [LOT]

Section B **(15 Question** x **10= 150)**

42. State the purpose of studying biology for engineers. Explain Brownian motion. [CO1] [Unit-I] [Understand] [LOT]

43. Differentiate between exothermic and endothermic reactions. Briefly explain the TCA cycle. [CO8] [Unit-VIII] [Understand] [LOT]

44. Draw and label the structure of a eukaryotic cell. [CO2] [Unit-II] [Remember] [LOT]

45. Explain genetic mapping with diagrams. [CO3] [Unit-III] [Analyze] [HOT]

46. Discuss the hierarchical classification based on cell structure and energy utilization. [CO2] [Unit-II] [Understand] [LOT]

47. Explain enzyme kinetics and its significance to biology. [CO5] [Unit-V] [Understand] [LOT]

48. Analyze the universality and degeneracy of the genetic code. [CO6] [Unit-VI] [Analyze] [HOT]

49. Compare monomeric and polymeric structures in biomolecules with examples. [CO4] [Unit-IV] [Understand] [LOT]

50. Explain Mendelian segregation and independent assortment with crosses. [CO3] [Unit-III] [Understand] [LOT]

51. Distinguish between glycolysis and Krebs cycle. [CO8] [Unit-VII] [Apply] [HOT]

52. Explain the principle and significance of sterilization in biotechnology. [CO9] [Unit-IX] [Understand] [LOT]

53. Evaluate the role of enzymes as transporters, receptors, and catalysts. [CO5] [Unit-V] [Evaluate] [HOT]

54. Analyze the structure and function hierarchy in proteins. [CO4] [Unit-IV] [Analyze] [HOT]

55. Evaluate the implications of DNA as genetic material in molecular biology. [CO6] [Unit-VI] [Evaluate] [HOT]

56. Explain the biochemical basis of phenotype-genotype mapping using examples. [CO3] [Unit-III] [Analyze] [HOT]

Section C **(5 Question** x **20= 100 Marks)**

57. Critically evaluate thermodynamics principles as applied to metabolic pathways in living cells with appropriate reactions. [CO8] [Unit-VIII] [Evaluate] [HOT]

58. Analyse how molecular taxonomy has transformed the modern classification of organisms? emphasizing the use of multiple criteria in establishing evolutionary relationships. [CO2] [Unit-II] [Analyze] [LOT]

59. Prepare a comparative analysis on genetic disorders caused by single gene mutations in humans. [CO3] [Unit-III] [Analyse] [HOT]

60. Critically examine the structure, properties and functions of nucleic acids in information transfer. [CO6] [Unit-VII] [Evaluate] [HOT]

61. Critically evaluate metabolic regulation in glycolysis and protein catabolism. [CO8] [Unit-VIII] [Evaluate] [HOT]

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Summary Sheet:

CO Wise

CO	Q. No	Marks
CO1	1, 2, 42	20
CO2	3, 4, 5, 6, 7, 8, 41, 44, 46, 58	75
CO3	9, 10, 11, 12, 13, 14, 15, 16, 45, 50, 56, 59	90
CO4	17, 18, 19, 20, 21, 38, 49, 54	50
CO5	22, 23, 47, 53	30
CO6	24, 25, 26, 27, 39, 40, 48, 55, 60	70
CO7	28	5
CO8	29, 39, 31, 37, 43, 51, 57, 61	80
CO9	32, 33, 34, 35, 36, 52	35
Total		**455**

Unit Wise

Unit	Q. No	Marks
Unit 1	1, 2, 42	20
Unit 2	3, 4, 5, 6, 7, 8, 41, 44, 46, 58	75
Unit 3	9, 10, 11, 12, 13, 14, 15, 16, 45, 50, 56, 59	90
Unit 4	17, 18, 19, 20, 21, 38, 49, 54	50
Unit 5	22, 23, 47, 53	30
Unit 6	24, 25, 26, 27, 39, 40, 48, 55, 60	70
Unit 7	28	5
Unit 8	29, 39, 31, 37, 43, 51, 57, 61	80
Unit 9	32, 33, 34, 35, 36, 52	35
Total		**455**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 51, 52, 54	285
HOT	47, 50, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63	170
Total		**455**

Prepared by: Kishore Kumar Roy

Disclaimer: -This is a Practice Set. The Question in End term examination will differ from the Practice Set. This Practice Set is meant for practice only.