BON SECOURS ARTS & SCIENCE COLLEGE FOR WOMEN

Rukmanipalayam, Mannargudi

DEPARTMENT OF PHYSICS

SEMESTER II

ALLIED PHYSICS-II

TWO MARK QUESTIONS

1. Mention the different types of number system.

2. How a decimal number is converted into a binary number?

3. Convert the decimal number **23** into a binary number.

4. How a fractional decimal number is converted into a binary number?

5. Convert **0.23** into a binary number.

6. How a binary number is converted into a decimal number?

7. Convert **1010** into a decimal number.

8. How an octal number **132** into a decimal number ?

9. Convert the octal number **132** into a decimal number.

10. How a decimal number is converted into an octal number ?

11. Convert the decimal number **99** into an octal number.

12. How a fractional decimal number is converted a into an octal number?

13. Convert the decimal number **0.15** into fractional octal number.

14. How an octal number is converted into a binary number?

15. Convert the octal number **13** into a binary number.

16. How a binary number is converted into an octal number?

17. Converted the binary number **1010111** into an octal number.

18. How a hexadecimal number is converted into a decimal number?

19. How a decimal number is converted into a hexadecimal number?

20. How a hexadecimal number is converted into a binary number?

21. How is binary number is converted into a hexadecimal number?

22. What is **1's** complement of a binary number?

23. What is **2's** complement of a binary number?

24. What is logic circuit?

25. What are the basic gates?

26. What is an **AND** gates?

27. Give the truth table of **AND** gate.

28. What is an **OR** gate?

29. Give the truth table of **OR** gate.

30. What is a **NOT** gate?

31. Give the truth table of **NOT** gate.

32. What is **NOR** gate?

33. Give the truth table of **NOR** gate.

34. Why is a **NOR** gate called as universal gate?

35. What is an **NAND** gate?

36. What is the principle of cloud chamber?

37. What are the two types of Wilson cloud chamber?

38. Mention any two uses of Wilson cloud chamber.

39. What is the principle of bubble chamber?

40. What are the advantages of bubble chamber?

41. Why is the optical photographic emulsion not suitable for work on nuclear radiation?

42. Mention any two advantages of photographic emulsion technique?

43. What are the limitations of photographic emulsion technique?

44. What is called the nucleus?

45. What are the masses of proton and neutron ?

46. What are nucleons?

47. What is atomic number and mass number?

48. What is the nuclear charges in an atom?

49. Define the atomic mass unit?

50. Mention any two types of nuclear model?

51. What are the two assumptions in the liquid drop model?

52. Mention any two analogies between the liquid drop and the nucleus?

53. What are the merits of liquid drop model?

54. Mention any two limitations of liquid drop model?

55. What are magic numbers?

56. Why are use the particle accelerators?

57. What is cyclotron?

58. Which are the disadvantages of cyclotron?

59. Give the truth table of **NAND** gate?

60. Why is a **NAND** gate called as universal gate?

61. Give the circuit symbol of **AND, NOT** and **OR** gate?

62. What is the difference between Boolean algebra and binary?

63. State Demorgans theorem?

64. Write Boolean' s laws of associative and distributive?

65. State De Morgan' s theorem?

66. What is fine structure?

67. What are the two new concepts in Sommer Field Atom model?

68. Draw the energy level diagram for the fine structure of $\mathbf{H_2}$ line?

69. What are the new ideas in vector atom model?

70. What is spatial quantization?

71. What is spinning of electron?

72. What are the different quantum numbers in vector atom model?

73. State Faulis exclusion principle.

74. How X-rays are produced and mention its wavelength range?

75. Define the penetrating power of X-rays.

76. What are hard and soft X-rays?

77. What is continous X-rays?

78. What is called characteristic X-rays?

79. What is the empirical law of Duane and Hunt?

80. State Moseley law.

81. What is a lattice plane?

82. What is Bragg' s law?

83. What is Miller indices?

84. State the rules for finding the Miller indices.

85. What is Lave spots?

86. Define Intensity of Magnetization with unit?

87. Define Magnetic induction.

88. Define Magnetic susceptibility.

89. What are the types of magnetic materials?

90. What are the properties of diamagnetic substances?

91. Define Hysteresis.

92. Define **B-H** curve and application of **B-H** curve.

93. Define Initial permeability.

94. What are insulators and conductors?

95. State Coulombs law in electrostatics.

96. Define relative permittivity.

97. Define the unit coulomb.

98. Define the capacitance of a conductor?

99. Define the unit farad?

100. What are the practical units of capacitance?

101. What is the principle of a capacitor?

102. What are the factors on which the capacity of a condenser depends?

103. What is the capacity of a spherical capacitor when the outer sphere is earthened and when the inner sphere is earthened?

104. Give different relations for the energy of a charged capacitor.

105. What happened to the loss of energy due to the sharing of charges?

106. Define Betatron.

107. Write a note on working of a betatron?

FIVE MARK QUESTIONS

1. Find the decimal equivalents of the following binary numbers?

a.**101** b.**11011** c.**1001.011** d.**10110.11**

2. What are the binary equivalents of the following decimal numbers?

a. **28** b. **176** c. **0.65** d. **22.83**

3. Convert the following octal numbers into decimal.

a. **27** b. **146** c. **0.23** d. **23.12**

4. Convert the following octal numbers into binary.

a. **14** b. **23** c. **17.24** d. **0.234**

5. Convert the following binary numbers into octal numbers.

a. **1001** b. **11011** c**. 1101.0110111** d. **0.101111**

6. Convert the following hexadecimal number into decimal number.

a. **1A** b. **8C** c. **B** d. **D**

7. Convert the following binary numbers into their equivalent hexadecimal numbers

a. **11010111** b. **10100110** c. **11001111**

8. Distinguish between an **AND** and an **OR** gate

9. Give salient features of nuclear shell model and point out its success and failures.

10. Describe the salient features of nuclear liquid drop model.

11. Give a brief account of the nuclear emulsion technique in the study of nuclear radiations.

12. Describe the principle, construction and working of a bubble chamber. Mention its uses.

13. Give an account of Somerfield relativistic atom model. Explain how its accounts for the fine structures of the spectral lines.

14. Explain the concept of vector atom model .Give an account of different quantum numbers required to specify the state of an electron in an atom.

15. Write note on
    - Spatial quantization .
    - Electron spin.
    -

16. State and explain Pauli's exclusion principle.

17. Distinguish between continuous X-ray spectra and characteristic X-ray spectra.

18. What are characteristic X-rays ? How is their production explained?

19. What is mean by magnetic susceptibility?

20. Relation between μ_m and μ_r ?

21. State and explain Coulomb's law in electrostatics. Hence define unit of charge?

22. Find the mechanical force exerted on the surface of a charged conductor?

23. Derive an expression for the electrostatic energy in the medium?

24. Write a note on the formation cloud on charged particles?

25. Write a note on electrified soap bubbles?

26. Define electrical capacity of a conductor. Define the **S.I.** unit for capacitance?

TEN MARK QUESTIONS

1. Describe the principle, construction and working of a bubble chamber .Mention its uses?

2. Compare a liquid drop with the nucleus?

3. Write a note on the followings:
   a. Nuclear size (b) Nuclear charge .
   b. Nuclear mass (d) Nuclear spin.

4. Discuss the theory of cyclotron and write its limitations?

5. Explain Synchro-cyclotron ?

6. Describe the working of the betatron ?

7. What are continuous X-rays? How do this originate in an X-ray tube?

8. Describe Moseley work on X-rays. What is its important?

9. Derive the relation $\mathbf{2dsin\emptyset = n\lambda}$ **.**

10. What is Miller induces? Describe how will you determine the miller induces. .

11. Describe the X-ray diffraction powder photographic method for determining the crystal structure of sample available in the form the powder?

12. Describe the Laue diffraction phenomenon in X-rays .Outline its theory and explain how wave length of X-ray was determined with the help of Laue spots?

13. What are the properties of ferromagnetic substances?

14. What are the uses of ferromagnetic materials?

15. Explain the principle of capacitor?

16. Calculate the capacity of a condenser, consisting of two spheres of radii **a** and **b.**

17. Derive the expression for the capacity per unit length of a cylindrical capacitor.

18. Derive an expression for the energy stored in a condenser.

19. Show that there is always loss of energy due to sharing of charges.

20. Define an **AND** gate. Discuss its action with a circuit and a truth table.

21. Define an **OR** gate . Discuss its action with a circuit and a truth table.

22. What are **NOR** and **NAND** gate?.Give the circuit and the truth table.

23. Explain the Half adder with the help of truth table.

24. Explain the Full adder with the help of truth table.

25. Write on short note on Half subtractor?

26. Write on short note on Full subtractor?

27. State and prove on De Margan's theorems with the help of truth tables?

28. Discuss Half and Full adders and draw its logical symbol, logical map?

29. Discuss Half and Full substractors and draw its logical symbol, logical diagram and truth table.

30. Prove that following:
    - AB + AB = A
    - A + AB = A + B
    - (A + B) (A + B) =A.
    -

31. Simplify the following using Booleam algebra.
    - ABC + AB$\bar{C}$ + A$\bar{B}$C.
    - $\bar{A}\bar{C}$ + $\bar{B}\bar{C}$ + $\bar{A}$BC + ABC .
    - $\bar{A}\bar{B}\bar{C}$D + AB$\bar{C}\bar{D}$ + ABC$\bar{D}$ + $\bar{A}\bar{B}\bar{C}\bar{D}$ + $\bar{A}$BC$\bar{D}$.