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PHYSICS

BOOKS - CHETANA PHYSICS (MARATHI ENGLISH)

SEMICONDUCTORS

Exercise

1. What do you mean by semiconductor?

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2. On what basis was electrical properties of materials classified before the discovery of semiconductors.

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3. On what factors do the electrical conduction in solids depend upon?

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4. What are the different types of electric conductors?

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5. Explain the term 'conductors' with examples.

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6. What do you mean by insulators? Give examples.

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7. What do you mean by semiconductor? Give examples.

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8. State the uses of semiconductor in modern times.

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9. Give the classification of materials depending upon conductivity.

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10. Explain the term Mobility of a charge carrier. State factors on which it depends.

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11. Draw suitable graphs to show temperature dependence of electric conductivity of metals

and semiconductors. Write your interpretation.

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12. Give the types of semiconductors with examples.

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13. Why are the electrical properties of semiconductors different from metals and

insulators

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14. State Pauli's Exclusion principle.

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15. Define energy band in a solid crystal.

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16. Define Valence band in a solid crystal.

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17. What is forbidden gap in a solid crystal?

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18. What is conduction band in solid crystal?

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19. What is Fermi level in a solid crystal?

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20. Compare valence band and conduction band.

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21. Define and explain the concept of energy band.

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22. Distinguish between insulator, conductor and semiconductor on the basis of energy band structure

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23. Explain the electrical conductivitiesof conductor, semiconductor and insulator

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24. What do you mean by Intrinsic Semiconductor.

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25. At absolute zero temperature, what does an Intrinsic semiconductor behave like?

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26. What is the relation between number of holes and number of electrons in intrinsic semiconductor.

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27. What is a hole in semiconductor?

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28. Explain the behaviour of intrinsic semiconductor at absolute temperature and at room temperature.

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29. What is doping in semiconductors.

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30. State the different types of extrinsic semiconductors.

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31. What is extrinsic semiconductor?

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32. Why holes do not exist in a conductor.

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33. What is the charge om N-type semiconductor p-type semiconductor ?

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34. Define Donor impurity and Acceptor impurity.

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35. Define and Explain formation of N-type semiconductor.

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36. Explain the structure of n-type semiconductor and draw energy level diagram.

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37. Explain the structure of P-type semiconductor.

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38. Give three examples of donor impurity and three examples of acceptor impurity.

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39. Distinguish between N-type and P-type semiconductors.

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40. What are electron current and hole current?

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41. What are trivalent and pentavalent impurities?

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42. Why is the conductivity of N-type semiconductor greater than that of P-type semiconductor even when both of these have same level of doping?

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43. Distinguish between intrinsic semiconductors and extrinsic semiconductors.

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44. A pure silicon crystal has 4×10^{28} atoms m^{-3}. It is droped by 1ppm concentration of antimony. Calculate the number of electrons and holes $n_i = 1.2 \times 10^{16} / m^3$

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45. A pure silicon crystal at temperature of 300K has electron and hole concentration $1.5 \times 10^{16} m^{-3}$ each $(n_c = n_h)$. Doping by indium increase $(n_e = n_h)$ to $4.5 \times 10^{22} m^{-3}$. Calculate n_e for the doped silicon crystal.

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46. What is P-N Junction

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47. Define Depletion layer

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48. Define Barrier potential

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49. What is P-N Junction ? Explain construction and working of P-N Junction.

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50. Explain the importance of the depletion region in a P-N junction diode.

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51. Distinguish between forward bias and reverse

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52. What causes a larger current through a P-N junction diode when forward biased?

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53. How is a P-N junction diode fabricated?

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54. What do you mean by P-N junction diode?

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55. Draw the labelled symbol for a Junction diode.

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56. Explain different ways of connecting a P-N junction diode with cell.

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57. What happenstopotential barrier and depletion layer in forward biased connection and reverse biased connection.

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58. With a neat labelled diagram Explain V-I characteristics of P-N junction diode.

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59. What is avalanche breakdown for a P-N junction diode in reversed biased mode.

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60. Explain the concept of zero biased junction diode and dynamic equilibrium

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61. What is knee voltage in P-N junction forward biased divide?

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62. What will be the value of resistance in ideal diode?

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63. Explain Static (DC) resistance and Dynamic (AC) resistance

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64. State few advantages of semiconductor devices.

Watch Video Solution

65. State few disadvantage of semiconductor devices

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66. What is solar cell? Draw the symbol and State its use.

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67. What is photo resistor? Draw the symbol, state the uses

Watch Video Solution

68. Explain Bi-Polar Junction transistor with symbol and uses

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69. What is photo diode? Draw the symbol and state uses.

Watch Video Solution

70. What is Light Emitting diode (LED)? Draw the symbol and state the uses?

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71. What is solid state laser?

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72. What is Integrated Circuit (1C)?

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73. What are electric and electronic devices. Give suitable examples.

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74. Write a short note on thermistor

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75. What types of materials are used for making thermistor?

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76. Draw the symbol of thermistor

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77. State the uses of thermistor

Watch Video Solution

78. State relation between temperature and resistance in NTC and PTC thermistor.

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79. Electric conduction through semiconductor is due to

A. electrons

B. holes

C. none of these

D.

Answer:

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80. The energy levels of holes are

A. in the valence bond

B. in the conduction bond

C. on the bond gap but dose to conduction band

D. in the bond gap but close to valence band

A. in the valence bond

B. in the conduction bond

C. on the bond gap but dose to conduction band

D. in the bond gap but close to valence band

Answer:

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81. Current through a reverse biased p-n Junction, increase abruptly at

A. break down voltage

B. 0.0 Volt

C. 0.3 V

D. 0.7 Volt

Answer:

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82. A reverse biased diode, is equivalent to

A. an off switch

B. an on switch

C. a low resistance

D. none of the above

Answer:

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83. The potential barrier in P-N diode is due to

A. depletion of positive charges near the Junction

B. accumulation of positive charges near the Junction

C. depletion of negative charges near the Junction

D. accumulation of positive and negative charges near the Junction

Answer:

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84. The electrical behaviour of a solid is determined by

A. number of electrons in the inner most orbit.

B. width of valence bond.

C. width of forbidden energy gap.

D. width of conduction band

Answer:

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85. Most widely used semiconductor material is

A. Si

B. Ga As

C. Diamond

D. Sulphur

Answer:

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86. A pure silicon crystal at absolute zero temperature behaves as

A. conductor

B. insulator

C. semiconductor

D. superconductor

Answer:

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87. The charge carriers in semiconductor are

A. only electron

B. only hole

C. hole and electron

D. ions

Answer:

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88. In N-type semiconductor

A. fermi level lies close to conduction band

B. fermi level lies dose to valence band

C. fermi energy level lies in conduction band

D. fermi energy level liesin valence band.

Answer:

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89. In P-type semiconductor majority charge carriers are

A. electrons

B. electrons and holes

C. holes

D. ions

Answer:

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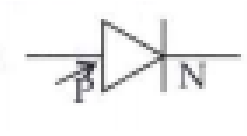
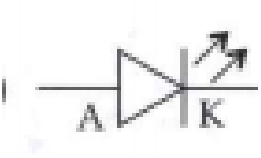
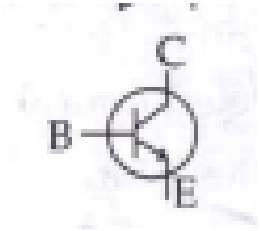
90. Symbolically LED is represented as

A. 

B. 

C. 

D. 

Answer:

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91. The materials most commonly used for solar cells are

A. silicon and gallium arsenide

B. gallium arsenide

C. cadmium sulphide

D. all of these

Answer:

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92. In semiconductor, acceptor impurity is....

A. antimony

B. indium

C. phosphorous

D. arsenic

Answer:

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93. The width of depletion region....

A. becomessmall in forward bias of diode

B. becomes large in forward bias of diode

C. is not affected upon by the bias

D. becomessmall in reverse bias of diode.

Answer:

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94. When a hole is produced in P-type semiconductor, there is.....

A. extra electron in valence band.

B. extra electron in conduction band

C. missing electron in valence band

D. missing electron in conduction band.

Answer:

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95. For an extrinsic semiconductor, the valency of acceptor impurity is

A. 3

B. 4

C. 5

D. 1

Answer:

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96. A photo diode is used in

A. regulated power supply

B. an indicator

C. an optocoupler

D. logic gate

Answer:

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97. In any type of transistor, one part of the transistor which supplies majority charge carrier is

A. emitter

B. base

C. collector

D. base and collector

Answer:

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98. Depletion layer of unbiased p-n junction diode contains.....

A. $+ve$ ions and $-ve$ ions

B. no $+ve$ ions and $-ve$ ions

C. only $+ve$ ions

D. only $-ve$ ions

Answer:

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99. Number of electrons = Number of holes in conduction band and valence band. So that solid is

A. insulator

B. conductor

C. semiconductor

D. ohmic

Answer:

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100. Colour of the radiation emitted by LED containing silicon carbide and zinc selenide is

A. red

B. blue

C. orange

D. yellow

Answer:

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101. Function of limiting resistance in LED is

A. to control current through LED

B. to control intensity of light

C. to control wavelength of light

D. (a) and (b) both

Answer:

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102. The approximate ratio of resistances in the forward and reverse bias of the P-N junction diode is

A. $10^2 : 1$

B. $10^{-2} : 1$

C. $1 : 10^{-4}$

D. $1 : 10^4$

Answer:

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103. The resistance of P-N-junction diode in forward bias is

A. high

B. 2

C. infinity

D. a few ohms

Answer:

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104. In P type semiconductor, there are

A. no majority carriers

B. immobile $-ve$ ions

C. immobile $+ve$ ions

D. none of these

Answer:

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105. In N-type semiconductor, there are

A. no majority carriers

B. immobile $-ve$ ions

C. immobile $+ve$ ions

D. none of these

Answer:

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106. A solar cell converts solar energy into

A. heat energy

B. chemical energy

C. electric energy

D. light energy

Answer:

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107. GaAs is used to prepare

A. Zener diode

B. Transistor

C. LED

D. full wave rectifier

Answer:

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108. Current through a reverse biased p-n Junction, increase abruptly at

A. break down voltage

B. 0.0 Volt

C. 0.3 V

D. 0.7 Volt

Answer:

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109. For an extrinsic semiconductor, the valency of acceptor impurity is

A. 3

B. 4

C. 5

D. 1

Answer:

Watch Video Solution

110. In any type of transistor, one part of the transistor which supplies majority charge carrier is

A. emitter

B. base

C. collector

D. base and collector

Answer:

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111. The resistance of P-N-junction diode in forward bias is

A. high

B. 2

C. infinity

D. a few ohms

Answer:

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112. Name the three types of electrical conductors?

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113. State Pauli's Exclusion principle.

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114. What is P-N Junction

Watch Video Solution

115. What is a solar cell?

Watch Video Solution

116. What is bi-polar junction transistor? Draw the symbol.

Watch Video Solution

117. Explain dynamic and static resistance of a diode.

Watch Video Solution

118. State few advantages of semiconductor devices.

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119. What is thermistor? State its uses.

Watch Video Solution

120. Explain intrinsic semiconduction with example.

Watch Video Solution

121. Explain valence bond and conduction bond.

Watch Video Solution

122. Draw a labelled diagram of forward biased P-N junciton diode.

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123. Define and Explain formation of N-type semiconductor.

Watch Video Solution

124. Explain the P-type semicondutors.

Watch Video Solution

125. Explain forward biasing in P-N junction diode with diagram.

Watch Video Solution

126. Explain the importance of the depletion region in a P-N junction diode.

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127. The dimension for Torque is

A. $M^2L^1T^3$

B. $M^2L^2T^{-2}$

C. M^2L^1T-2

D. $M^{-1}L^3T^{-2}$

Answer:

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128. $\overline{A} = 2\hat{i} + 3\hat{j}$ and $\bar{b} = 3\hat{i} + 5\hat{j}$ Then $\bar{a} \times \bar{b}$ is

A. $1\hat{k}$

B. $2\hat{k}$

C. $3\hat{k}$

D. $4\hat{k}$

Answer:

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129. The equation of time of light is

A. $\frac{u \sin \theta}{g}$

B. $\frac{2u \sin \theta}{g}$

C. $\frac{u^2 \sin 2\theta}{g}$

D. $\frac{u^2 \sin^2 \theta}{g}$

Answer:

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130. State the work energy theorem.

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131. At what angle will the horizontal range be maximum?

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132. Find a vector, which is parallel to $\vec{v} = \vec{i} - 2\vec{j}$ and has a magnitude 10.

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133. Show that $1J = 10^7$ erges.

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134. If a force of $2\bar{i} - 5\bar{j} + \bar{k}$ (N) acts on a body and displaces it to a distance of

$4\bar{i} - 3\bar{j} - 2\bar{k}$ metres. Calculate the work done.

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135. In a case of a projectile, derive an expression for time of ascent.

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136. Differentiate between real and pseudo force.

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137. State two characteristics of dot product.

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138. Show that the equation $V = u + at$ is dimensionally correct.

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139. The time period ,for the oscillation , of a simple pendulum were recorded, 5 readings were taken they were 2.00 sec., 2.02 sec., 1.96 sec., 2.03 sec, 1.99 sec

Find the Most Probable value

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140. The time period ,for the oscillation , of a simple pendulum were recorded, 5 readings were taken they were 2.00 sec., 2.02 sec., 1.96

sec., 2.03 sec, 1.100 sec

Find the Final absolute error

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141. The time period ,for the oscillation , of a simple pendulum were recorded, 5 readings were taken they were 2.00 sec., 2.02 sec., 1.96 sec., 2.03 sec, 1.101 sec

Find the Percentage error.

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142. Show that the trajectory of a projectile is a parabola, which can be expressed as $y = bx - cx^2$

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143. Show that $P = \frac{1}{3}\rho c^2$ is dimensionally correct where P= Pressure, C = speed, $\rho = density.$

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144. What is a conical pendulum? Derive an expression for a time period of a conical pendulum.

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145. Derive expression for final velocities v_1 and v_2 for an Elastic collsion.

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146. The magnitude of scaler product of two unit vectors perpendicular to each other is.

A. zero

B. 1

C. (-1)

D. 2

Answer:

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147. Light year is a unit of

A. Time

B. Mass

C. Distance

D. Luminosity

Answer:

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148. For a particle having a uniform circular motion, which of the following is constant.

A. Speed

B. Acceleration

C. Velocity

D. Displacement

Answer:

Watch Video Solution

149. The dimension for Torque is

A. $\left[M^1L^1T^{-2}\right]$

B. $\left[M^1L^2T^{-2}\right]$

C. $\left[M^0L^1T^{-1}\right]$

D. $\left[M^1L^1T^1\right]$

Answer:

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150. The weight of a particle at the centre of the earth is

A. infinite

B. zero

C. same as that at other places

D. greater than at the pole

Answer:

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151. The ability of a material to resist fracturing when force is applied to it, is called

A. toughness

B. hardness

C. elasticity

D. plasticity

Answer:

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152. If α, beta, and gamma` are coefficients of linear, area l and volume expansion of a solid then

A. $\alpha : \beta : \gamma\ 1 : 3 : 2$

B. $\alpha : \beta : \gamma\ 3 : 1 : 2$

C. $\alpha : \beta : \gamma\ 2 : 3 : 1$

D. $\alpha : \beta : \gamma\ 3 : 2 : 1$

Answer:

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153. What is thermal stress?

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154. Define Poisson's ratio.

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155. Draw a graph showing the variation of gravitational acceleration due to depth from the earth's surface.

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156. Define coefficient of restitution

Watch Video Solution

157. Define : Free fall

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158. $\vec{A} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{B} = \hat{i} - 2\hat{j} + 3\hat{k}$ find $\vec{A} \cdot \vec{B}$

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159. Write the dimension value of power & pressure.

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160. The diameter of a sphere is 2.14 cm, calculate the volume of the sphere to the correct number of significant figures.

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161. Show that vectors $\overrightarrow{a} = 2\hat{i} + 5\hat{j} + 6\hat{k}$ and $\overrightarrow{b} = \hat{i} + \frac{5}{2}\hat{j} + 3\hat{k}$ are parallel

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162. If the motion of an object is described by $x = f(t)$. Write formula for instantaneous velocity and acceleration.

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163. Justify the statement, "Work and energy are the two sides of a coin."

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164. Calculate the speed of a satellite in an orbit at a height of 1000 km from the Earth's surface.

$M_E = 6 \times 10^{24} kg\, R_E = 6.410^6 m$

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165. State any four methods to reduce friction

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166. Which materials can be used asthermal insulates and why?

Watch Video Solution

167. How a thermometer is calibrated?

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168. A rubber band originally 30 cm. long is stretched to a length of 32cm by a certain

load. What is the strain produced?

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169. Why does an astronaut in an orbiting satellite have a feeling of weight lessness?

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170. Four uniform solid cubes of edges 10 cm, 20 cm, 30 cm and 40 cm are kept on the

ground, touching each other in order. Locate centre of mass of their system.

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171. In Ohm's experiments, the values of the unknown resistances were found to be 6.12Ω, 6.09Ω, 6.22, 6.15Ω. Calculate the absolute error, relative error and percentage error in these measurements.

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172. State any six properties of scalar product.

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173. Show that the path of a projectile is a parabola

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174. Discuss the variation of acceleration due to gravity with altitude.

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175. What is the stress in a wire which is 50 meter long and 0.01cm2 in crosssection, if the wire bears a load of 100 kg?

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176. The thermal conductivity of steel is 0.026 k cal/ms K. Find the temperature diference between two sides of a steel plate 4 cm thick, when heat is transmitted through the plate at

the rate of 400 k cal per minute per squar metre of steady state.

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177. Define Sublimation and Triple point. In a random temperature scale X, water boils at $200^\circ X$ and freezes at 20° X. Find the boiling point of a liquid in this scale if it boils at $62^\circ C$

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178. Derive an expression for strain energy per unit volume of the material of a wire.

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179. Derive an expression for critical velocity of satellite. Calculate the acceleration due to gravity at a height of 300 km from the surface of the earth. $M = 6 \times 10^{24} kg$ R = 6400 km.

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180. State and prove the law of conservation of linear momentum.

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181. The branch of Physics which deals with the production of transmission and reception of sound is called

A. reverberation

B. Acoustics

C. Pitch

D. Doppler effect

Answer:

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182. The equation shown below is

$$\frac{n_2 - n_1}{R} = \frac{n_2}{v} - \frac{n_1}{u}$$

A. Prism formula

B. Dispersive power

C. Dispersion at a spherical surface

D. Lens makers equation

Answer:

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183. What is the magnitude of charge on an electron?

A. $1.6 \times 10^{-9} C$

B. $9.1 \times 10^{-31} C$

C. $1.732 \times 10^{-11} C$

D. $6.67 \times 10^{-11} C$

Answer:

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184. The product of the magnitude of the charge and the distance between the two charges on a dipole, is called

A. Electric dipole

B. Electric pole strength

C. Electric dipole moment

D. Electric intensity

A. Electric dipole

B. Electric pole strength

C. Electric dipole moment

D. Electric intensity

Answer:

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185. State Gauss Law

Watch Video Solution

186. Define Dispersive Power.

Watch Video Solution

187. Calculate the velocity of sound if the frequency of the wave is 4 Hz and the wavelength of the wave is 80 meters.

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188. Define Total internal reflection

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189. Define Mirage

Watch Video Solution

190. Write a note on periscope. (Diagram essential)

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191. A man shouts loudly close to a high wall. He hears an echo. If the man is at 40 m from the wall, how long after the shout will the echo be heard? (speed of sound in air = 330 m / s)

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192. State law of characteristics of electric lines of force.

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193. Draw a well labelled diagram for magnifying power of a simple microscope.

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194. State Coulombs Law and Define relative permitivity.

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195. For a dense flint glass prism of refracting angle 10^0, Findthe anangular deviation for extreme colours and the dispersive ppower for dense flint glass. $(n_{red} = 1.712,$ $n_{vio \leq t} = 1.792)$

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196. Derive an expression for couple acting on an electric dipole kept in a uniform electric field.

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197. Explain the effect of change in temperature on the speed of sound in air.

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198. Derive an expression for electric field intensity of a point on the equatorial line.

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199. Derive an expression for magnifying power of a compound microscope.

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200. Derive an expression for apparent frequency when the source is moving and

listener is stationery

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201. Light year is a unit of

A. Time

B. Mass

C. Distance

D. Luminous intensity

Answer:

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202. Two plane mirrors are inclined at an angle of 40° between them. Number of images seen of a tiny object kept between them is

A. only 8

B. only 9

C. 8 or 9

D. 9 or 10

Answer:

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203. The value of acceleration due to gravity is zero at

A. the equator of the earth

B. the centre of the earth

C. the pole of the earth

D. slightly above the surface of the earth

Answer:

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204. Change in dimensions is known as

A. deformation

B. formation

C. contraction

D. strain

Answer:

Watch Video Solution

205. When sound waves travel from air to glass, which of these remain constant?

A. velocity

B. frequency

C. wavelength

D. all of above

Answer:

Watch Video Solution

206. Earth's atmosphere is richest in

A. Intra red

B. Ultra violet

C. X-ray

D. Microwaves

Answer:

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207. Which of the following is an Ohmic conductor?

A. Transistor

B. Diode

C. Electrolyte

D. copper wwire

Answer:

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208. Range of temperature in a clinical thermometer, which measures the temperature of human body, is

A. $70^\circ C$ to $100^\circ C$

B. $34^\circ C$ to $42^\circ C$

C. $0^\circ F$ to $100^\circ F$

D. $34^\circ F$ to $80^\circ F$

Answer:

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209. An object of mass 100 gm moves uniformly along a circular orbit with an angular speed of $25 rad/\sec$. If the linearspeed of particle is $25 m/s$ then the radius of circle is

A. 1m

B. 2m

C. 4m

D. 5m

Answer:

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210. A mass 2m moving with some speed is directly approaching another mass m moving with double speed. After some time, they collide with coefficient of restitution 0.5 Ratio of their respective speeds after collision is

A. $1/2$

B. $2/3$

C. $3/2$

D. 2

Answer:

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211. The speed of light is $3 \times 10^8 m/\sec.$ Calculate the frequency of red light of wavelength of 6.5×10^{-7} m.

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212. Find the magnitude of a vector $\vec{a} = \frac{\hat{i} - \hat{j}}{\sqrt{2}}$

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213. State Newton's law of gravitation.

Watch Video Solution

214. Define uniform circular motion.

Watch Video Solution

215. Write the formula for coefficient of linear expansion of a solid.

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216. What is position vector?

Watch Video Solution

217. Define Dimensional formula for any physical quantity.

Watch Video Solution

218. Define one Coulomb.

Watch Video Solution

219. Show that the path of a projectile is a parabola

Watch Video Solution

220. Derive dimensions for power.

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221. As I was standing on a weighing machine inside a lift it recorded 50 kg-wt. Suddenly for few seconds it is recorded 42 kg-wt. What must have happened during that time? Explain with complete numerical analysis.

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222. State any four characteristics of vector product of vectors.

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223. A metal cube of side lm is subjected to a force. The force acts normally on the whole surface of cube and its volume changes by $1.5 \times 10^{-5} m^3$. The bulk modulus of metal is

$8 \times 10^{10} N/m^2$. Calculate the change in pressure.

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224. At what temperature will the speed of sound in air be 2 times its speed at NTP?

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225. Derive an expression for couple acting on an electric dipole kept in a uniform electric

field.

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226. Define temperature coefficient of resistivity. State its S.I unit.

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227. Explain term : Convection.

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228. Two satellites A and B are revolving round a planet. Their periods of revolution are 1 hour and 27 hour respectively. The radius of orbit of satellite A is $8 \times 104km.$, find radius of orbit of satellite B.

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229. A convex lens held some distance above a 10cm long pencil produces its image of some size. On shifting the lens by a distance equal

to its focal length, it again produces the image of the same size as earlier. Determine the image size.

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230. Explain the N-type semicondutors.

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231. Obtain an expression for binding energy of a satellite revolving in a circular orbit

around earth.

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232. If $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$ and $\vec{B} = \hat{i} + 4\hat{j} - 3\hat{k}$ then find (a) $\vec{A} \cdot \vec{B}$ (b) $\vec{A} \times \vec{B}$

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233. Explain forward biasing in P-N junction diode with diagram.

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234. Name three basic units of communication system. Draw the labelled block diagram of the basic elements of a communication system

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235. Derive an expression for strain energy of the material of wire.

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236. A metal sphere cools at the rate of $1.6^{\circ} C / \min$ when itstemperature is $60^{\circ} C$. At what rate will it cool when its temperature is $50^{\circ} C$? The temperature of surroundings is $30^{\circ} C$.

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237. Explain fundamental forces in nature.

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238. Derive an expression for refraction at single spherical surface.

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239. Derive formula for kinetic energy of a body having mass M and velocity V using dimensional analysis.

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240. Derive expression for Magnetic induction due to a bar Magnet at a point along the axis.

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241. State any six properties of magnetic lines of force.

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242. Draw the diagram showing two cells connected in series. State advantages and disadvantages of cell connected in series

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243. State the expression for apparent frequency when source of sound and listener are moving towards each other

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244. State the expression for apparent frequency :

i. when source of sound and listener are moving away from each other.

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245. State the expression for apparent frequency :

i. when source is stationary and listener is moving away from stationary source.

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246. Derive an expression for apparent frequency when source is moving and listener is stationary.

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247. Define elastic collision

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248. Define in elastic collision. Derive an expression for velocities for head-on elastic collision.

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249. State the formula and unit of electric dipole moment.

A charge of 50 μC is kept at the centre of a sphere of radius 0.1m. What is the flux through the sphere?

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250. From given data set, determine angular dispersion by the prism for extreme colours.

$n_R = 1.622, n_V = 1.656$ and $\delta_R = 2.1^\circ$

State two conditions for total internal reflection.

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251. Distinguish between average velocity and instantaneous velocity. (Any two points) A man

throws a ball to maximum horizontal distance of 160m. Calculate the maximum height reached.

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