50 (i) As the bucket is filled, the sound becomes shriller due to decrease in length of air column and increase in frequency.
(ii) The change in sound takes place due to change in frequency of sound due to decrease in the length of the air column. **[ICSE 2013]**

51. Heat capacity : Heat capacity of the body is the amount of heat energy required to raise the temperature by 1°C or 1 K. The S.I. unit of heat capacity is joule per kelvin (or JK^{-1}). **[ICSE 2013]**

*52.

53. (i) γ-radiations.
(ii) α and β are deflected by an electric field **[ICSE 2013]**

54. SONAR is based on the principle of reflection of sound i.e., echo. **[ICSE 2013]**

55 (i) Resonance.
(ii) The frequency of the tuning fork and the natural frequency of the vibrating air column become equal. The air column vibrates with large amplitude thus producing a loud sound. **[ICSE 2013]**

56. (1) **Amplitude** : Maximum displacement of the vibrating particle on either side of the mean position is called amplitude.
(2) **Frequency** : Number of oscillations completed by the wave in one second is called frequency. **[ICSE 2013]**

57. When the strings vibrate the air column inside the box is set into forced vibrations. Since the sound box has a large area, it sets a large volume of air into vibration of the same frequency as that of the string, thereby producing resonance. **[ICSE 2013]**

58. Temperature of the surroundings starts falling when the ice starts melting because every 1 gm of ice requires 336 J to convert it into water at 0°C so extracts a great amount of heat from the atmosphere. **[ICSE 2013]**

59. Heat capacity $= \frac{\Delta\theta}{\Delta T} = \frac{mc\Delta T}{\Delta T} = mc$

i.e., Heat capacity = mass × specific heat capacity **[ICSE 2013]**

60. Bottles of soft drink cools faster when surrounded by ice cubes because every 1 gm of ice on melting requires 336 J. So, it extracts a large amount of heat from the bottle hence, they cool faster. **[ICSE 2013]**

60. (i) Radioactivity : Process of spontaneous emission of α, β and γ radiations from the nuclei of atoms during their decay.
(ii) After disintegration the radioactive material finally converts into lead and still it holds some radioactivity. This is called nuclear waste.
(iii) Delay and decay method is the effective way for the safe disposal of nuclear waste. **[ICSE 2013]**

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65. (i) Mechanical waves are waves which requires medium for their propagation i.e., cannot travel in vacuum. E.g. sound waves
(ii) Property of wave that does not change when it passes from one medium to another is frequency. **[ICSE 2014]**

66. (i) Vibration R as its amplitude is high.
(ii) Sound of string 'P' will have maximum shrillness as its frequency is maximum.
(iii) Let the frequency of the principal note in vibration R is f.
The frequency of vibration P is 3 f.
$\therefore \quad f_R = f$ and $f_P = 3f$
$\Rightarrow \quad f_R : f_p = 1 : 3$

But $\quad f \propto \frac{1}{a}$

$$\frac{a_P}{a_R} = \frac{f_R}{f_P} = \frac{1}{3}$$

$\therefore \quad \lambda_P : \lambda_R = 1 : 3$ **[ICSE 2014]**

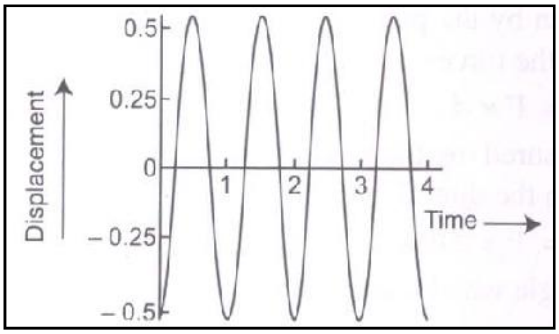
67. (i) An important property of such type of a waves is that they travel undeviated through long distances.

(ii) Speed, $v = \frac{2d}{t}$ **[ICSE 2014]**

68. Specific heat capacity of A is 3.8 J/g/K.
Specific heat capacity of B is 0.4 J/g/K.
(i) 'B' is a good conductor of heat.
(ii) The specific heat capacity of B is lower than A. This means that less heat is required to raise the temperature of lg of B by 1K than the heat required for A.
(iii) 'A' will be preferred as it absorbs large amount of heat energy without raising its own temperature much as its specific heat capacity is high. **[ICSE 2014]**

*69.

70. (i)



(ii) A body can execute free vibrations in vaccum because the presence of any medium offers some resistance as a result the amplitude of vibrations does not remain constant. **[ICSE 2015]**

71. Water boils at higher temperature because of the increase in pressure or impurity. More the impurity or pressure, more will be the boiling point. **[ICSE 2015]**

72. (i) The safe limit of sound level for human hearing is in the range of 0 to 80 dB.
(ii) The characteristic of sound in relation to its waveform is quality or timbre. **[ICSE 2015]**

*73. (i)
(ii) High specific heat capacity of water makes it an effective coolant. **[ICSE 2015]**

74. (i) This is because of high specific latent heat of fusion of ice (equal to 336000 J/Kg). So to freeze water a large quantity of heat has to be taken out from water to freeze it.
(ii) The principle of calorimetry states that heat energy lost by a hot body is equal to the heat energy gained by the cold body, provided no heat is lost to surrounding.
(iii) It is based on the law of conservation of energy.
(iv) The melting point of ice decreases with the increase in impurities in it. **[ICSE 2015]**

75. (i) The heat energy required to raise the temperature of the body by 1 K is 60 J.
(ii) The heat energy required to raise the temperature of 1 kg of lead by 1 K is 130 J. **[ICSE 2016]**

76. Heat absorbed by a body depends on (1) the mass of the body, and (2) the rise in temperature of the body. **[ICSE 2016]**

77. Given : $a_1 : a_2 = 3 : 4$
(i) Loudness $\alpha\ a^2$ $\therefore$ ratio of loudness = $(a_1 / a_2)^2 = (3/4)^2 = 9 : 16$
(ii) The frequency does not depend on amplitude.
$\therefore$ Ratio of frequencies = 1 : 1 **[ICSE 2016]**

78. The frequency of transverse vibrations of a stretched string can be increased :
(i) by increasing the tension on the string.
(ii) by decreasing the length of the string. **[ICSE 2016]**

79. The undesirable, loud and harsh sound of level above 120 dB which causes headache is called noise pollution.
Source : siren. **[ICSE 2016]**

*80. (i) The work function must be low.
(ii) The melting point must be high. **[ICSE 2016]**

81. There will be no change in the nature of radioactivity of the substance.
Reason : Radioactivity is a nuclear phenomenon. **[ICSE 2016]**

82. (i) When two bodies at different temperatures are mixed together, heat flows from the body at high temperature to the body at low temperature till both attain the same temperature. The amount of heat lost by the hot body is equal to the amount of heat gained by the cold body (if there is no loss of heat).
(ii) Principle of calorimetry.
(iii) The law of conservation of energy. **[ICSE 2016]**

83. (i) Ultrasonic waves.
(ii) The ultrasonic waves can travel undeviated through a long distance.
(iii) Their frequency is above 20,000 Hz (i.e., above the audible limit), so they are not audible. **[ICSE 2016]**

84. (i) An echo is the sound heared after reflection from a distant object when the original sound has ceased.
(ii) (a) The distance of reflector from the source of sound must be more than 17 m in air so that it takes a time more than 0.1 s for echo to reach the source.
(b) The reflector must be big in size. **[ICSE 2016]**

85. (i) Resonance.
(ii) The phenomena when a body vibrates with a very large amplitude, under a periodic force of frequency exactly equal to the natural frequency of vibrations of the body, is called resonance.
(iii) The loudness is that characteristic of sound which distinguishes a loud sound from a faint sound of same pitch and same quality.
(iv) Unit of loudness isphon. **[ICSE 2016]**

86. (i) Penetrating power — $\alpha < \beta < \gamma$
(ii) Ionising power — $\gamma < \beta < \alpha$
(iii) Biological effect — $\alpha < \beta < \gamma$ **[ICSE 2016]**

*87. (i) The function of anode is to accelerate and focus the cathode rays.
(ii) In a cathode ray tube, the electrical energy changes into the light energy.
(iii) Use : In T.V. as a picture tube. **[ICSE 2016]**

88. (i) Due to emission of a β-particle, atomic number increases by 1, but mass number is unchanged ${}^{A}_{Z}X \longrightarrow {}^{A}_{Z+1}Y + {}^{0}_{-1}\beta$
(ii) The elements with same mass number but different atomic number are called **isobars**.
(iii) The nucleus of an atom tends to be radioactive when the number of neutrons inside it exceeds the number of protons. **[ICSE 2016]**

89. Heat capacity of a body is the amount of heat energy required to raise its temperature by 1 K. Its S.I. unit is JK^{-1} (joule per Kelvin). **[ICSE 2017]**

90. By making base of a cooking pan thick, its heat capacity becomes large so it gets heated slowly and the food contents on it get sufficient heat for cooking. **[ICSE 2017]**

91. To prevent heat transference by radiation, the walls of calorimeter are polished and made smooth from inside as well as outside. **[ICSE 2017]**

92. The two factors are (1) material of the body and (2) temperature of the body. **[ICSE 2017]**

93. (i) Cathode rays (or electrons).
(ii) 6 volt.
(iii) The beam will deflect towards the positive plate. **[ICSE 2017]**

94. (i) Work function of the metal.
(ii) The temperature of the metal surface.
(iii) The surface area of the metal. **[ICSE 2017]**

95. (i) The loosely bound outer most electrons of atoms in a metal which leave their atoms and become free to move inside the metal, are called free electrons.
(ii) The free electrons can move in a random manner inside the metal but they do not have sufficient kinetic energy to leave the metal surface.
(iii) The free electrons can be made to leave the metal surface by imparting energy from outside either.
(1) by heating in thermionic emission, or
(2) by making the ultraviolet radiations incident on it in photoelectric effect. **[ICSE 2017]**

Note : ***** marked questions are not applicable as per new syllabus.

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