CBSE

SOUNDS WS 3

Class 09 - Science

Section A

1. **Statement 1:** Echo is produced when sound is incident on hard and polished surface. **[1]**
   Statement 2: Sound energy can be totally reflected by the objects with soft and loose texture.

   a) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
   b) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
   c) Both statements 1 and 2 are false.
   d) Statement 1 is true but statement 2 is false.

2. Absorbent materials are to be used while making interior design in an auditorium as **[1]**

   a) sound travels with a lesser velocity
   b) reverberation time has to be decreased
   c) it has to look good
   d) echo is to be increased

3. While verifying the laws of reflection of sound, out of following precautions which one should not be followed? **[1]**

   a) The reflecting surface should be smooth and hard
   b) Ear should not be placed close to the pipe
   c) The table top should be horizontal
   d) Length of pipes should be sufficiently long

4. The minimum size of a room required to hear an echo of sound with a speed of 300 m/s is **[1]**

   a) 17 m
   b) 15 m
   c) 16 m
   d) 14 m

5. Stethoscope works on the principle of: **[1]**

   a) Refraction of sound
   b) Multiple reflections of sound
   c) Ultrasounds
   d) Both multiple reflections of sound and ultrasound

6. When sound gets reflected from a surface: **[1]**

   a) the angle of reflection is always less than the angle of incidence
   b) the angle of reflection is always equal to the angle of incidence
   c) the angle of reflection is always equal to 90^o
   d) the angle of reflection is always more than the angle of incidence

7. In an auditorium or big hall the walls are provided with sound-absorbant materials, why? **[1]**

   a) To make the hall look better.
   b) So, that the sound from the stage may be heard properly.
   c) So, that echo effect may be minimized.
   d) So, that the sound may appear to be pleasing

8. In the experiment of verification of reflection of sound, the incident sound is directed along: **[1]**

a) axis of tube

b) at an angle of 45^o from the axis of the tube

c) normal to the axis of tube

d) at an angle of 30^o from the axis of the tube

9. The instruments Megaphone, Stethoscope, Hearing acids and Soundboards work based on the principle of: **[1]**

a) reflection

b) absorption

c) persistence

d) reverberation

10. Reflection of sound obeys the law **[1]**

a) $\angle i = 2 \angle r$

b) $\angle i = \angle r$

c) $\angle i < \angle r$

d) $\angle i > \angle r$

11. For reflection of sound wave, we need: **[1]**

a) A large size, the opaque reflecting surface

b) A glass plate

c) A polished mirror

d) A concave surface painted blue

12. A man who is standing at a point between two parallel walls fires a pistol. He hears echoes after 0.5 s and 0.8 s. A further echo is heard, after firing, at a time of _____. **[1]**

(Speed of sound = 330 m s^{-1})

a) 1.1 s

b) 1.3 s

c) 2.6 s

d) 2.2 s

13. Echo is not heard in a room of 10m $\times$ 10m $\times$ 10m dimension due to (speed of sound in air = 300 m/s). **[1]**

a) reflection

b) humidity

c) absorption

d) persistence

14. Curved soundboard may be placed behind the stage because: **[1]**

a) it reflects the sound to a particular point in the hall

b) it makes the stage look beautiful

c) sound waves may be absorbed

d) after reflection, sound waves spread evenly across the width of the hall.

15. A stone is dropped from the top of a tower of 125 m high into a pond which is at base of the tower. When will the splash be heard at the top? (Given g = 10 m s^{-2} and speed of sound = 340 m s^{-1}.) **[1]**

a) 5.36 s

b) 0.36 s

c) 5 s

d) 2 s

16. A student while verifying the laws of reflection of sound measured the angle between the incident sound wave and reflected sound wave as 110^o. The angle of reflection is: **[1]**

a) 220^o

b) 110^o

c) 55^o

d) 27^o

17. Ramjeet, while verifying the laws of reflection of sound, measured the angled between the incident sound wave and reflected wound wave to be 130^o. The angle of incidence is: **[1]**

a) 65^o

b) 25^o

c) 130^o

d) data insufficient

18. **Assertion (A):** If we stand in one corner of a big empty hall and shout the word **hello** we will hear the word **hello** coming from the empty hall. **[1]**

Reason (R): The sound of our **hello** is reflected from the walls of the hall and this reflected sound forms the echo.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** The flash of lightning is seen before the sound of thunder is heard. **[1]**

Reason (R): Speed of sound is greater than speed of light.

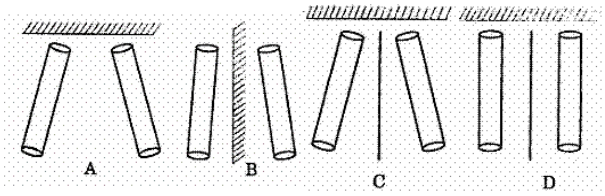
a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. To verify the law of reflection of sound, the set-up of the arrangement needed is the one shown in figure: **[1]**



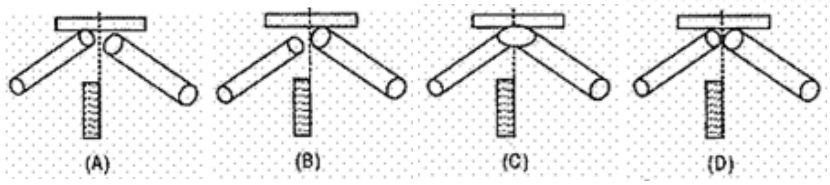
a) C

b) B

c) D

d) A

21. Which of the following is the correct experimental set-up for verification of laws of reflection of sound? **[1]**



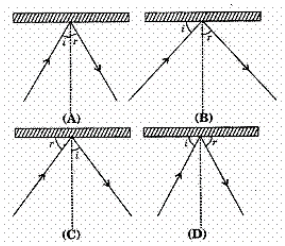
a) D

b) C

c) A

d) B

22. Four students after conducting an experiment on reflection of sound marked the angle of incidence, angle of reflection as follows. Which one is correct? **[1]**



a) B

b) D

c) C

d) A

23. A student has to choose from the following 'tubes' and 'plates' for doing the experiment on verifying the laws of reflection of sound : **[1]**

	Tubes available		Plates available

A	Tube of diameter 10 cm and length 50 cm	X	Polished metal 'plate'
B	Tube of diameter 2 cm and length 40 cm	Y	Rough wooden plate

The best choice, for her, is to 'combination' :

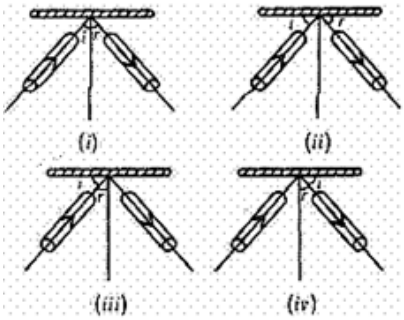
a) B, Y

b) B, X

c) A, Y

d) A, X

24. Four students after conducting an experiment on reflection of sound marked and angle of incidence, angle of reflection as follows which one is correct: **[1]**



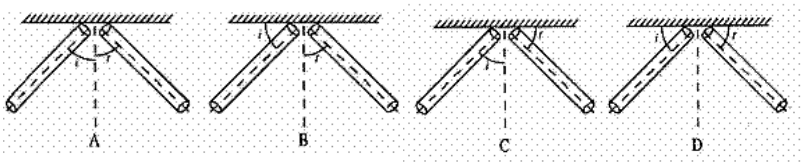
a) (iv)

b) (i)

c) (ii)

d) (iii)

25. While doing experiment on verifying the law of reflection of sound, four students measured the angles ∠i and ∠r as shown in the diagram below. The correct measurement of the angle of incidence and angle of reflection has been done by student **[1]**



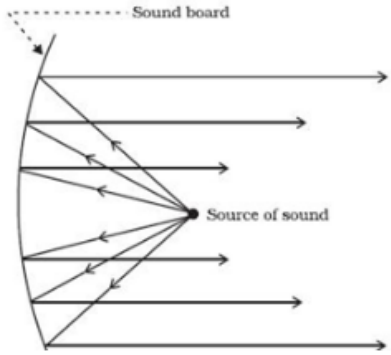
a) B

b) A

c) C

d) D

26. Soundboard work on the principle of: **[1]**



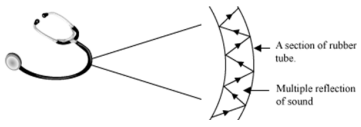
a) Reverberation

b) Echo

c) Multiple reflection

d) Reflection of sound

27. The sound of heartbeats reaches the doctor’s ears from stethoscope by **[1]**



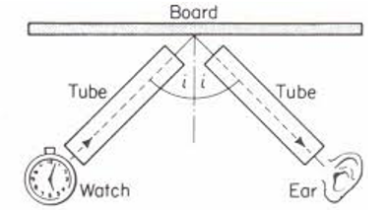
a) Multiple reflection

b) Reverberation

c) Reflection of sound

d) Echo

28. The given image shows the phenomena of: **[1]**



a) Reverberation

b) Echo

c) Reflection of sound

d) Multiple reflection

29. Echo is produced if the distance between the source of the sound and the listener is more than _____. **[1]**

a) 12 metre

b) 17 metre

c) 15 metre

d) 10 metre

30. In Young's double-slit experiment, the two slits act as coherent sources of equal amplitude a and of wavelength λ. In another experiment with the same setup, the two slits are sources of equal amplitude a and wavelength λ, but are incoherent. The ratio of intensities of light at the midpoint of the screen in the first case to that in the second case is **[1]**

a) 4 : 3

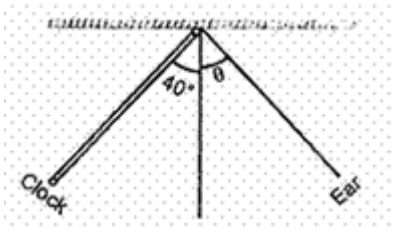
b) 1 : 2

c) 2 : 1

d) 3 : 4

31. Why are roofs and walls of an auditorium/hall generally covered with sound absorbent materials? **[1]**

32. In the experiment on studying the laws of reflection of sound, the tube facing the clock is placed as shown. The position of the second tube, at which the ear will get the best reflected sound, is obtained when θequals: **[1]**



33. An echo is heard in 3 s. What is the distance of the reflecting surface from the source, given that the speed of sound is 342 m s^{-1}? **[1]**

34. A person clapped his hands near a cliff and heard the echo after 2s. What is the distance of the cliff from the person if the speed of the sound, v is taken as 346 ms^{-1}? **[1]**

Section B

35. **State True or False:** **[2]**

(a) Multiple reflections of sound are used in megaphones, horns, musical instruments, and stethoscopes. **[1]**

(b) The laws of reflection for sound are the same as those for light. **[1]**

36. **Fill in the blanks:** **[2]**

(a) The repetition of sound caused by the reflection of sound waves from an obstacle is known as a/an _____. **[1]**

(b) The phenomenon of persistence or prolongation of audible sound after the source has stopped emitting it is called _____. **[1]**

37. Write full form of acronym SONAR. Explain how the method of echo- ranging is used to determine the depth of **[2]**

sea.

38. A Child hears an echo from a cliff 4 seconds after the sound from a powerful cracker is produced. How far away is the cliff from the child? (Take velocity of sound in air as 340 ms^{-1}) **[2]**

39. Does sound follow the same laws of reflection as light does? Explain. **[2]**

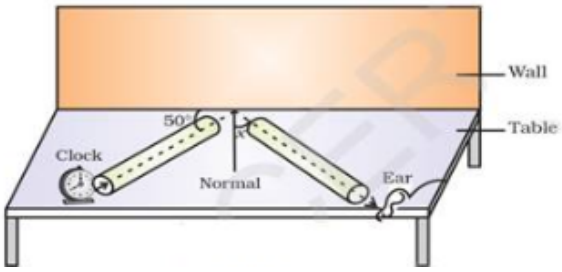
40. A girl is sitting in the middle of a park of dimension 12 m $\times$ 12 m. On the left side of it there is a building adjoining the park and on the right side of the park, there is a road adjoining the park. A sound is produced on the road by a cracker. Is it possible for the girl to hear the echo of this sound? Explain your answer. **[2]**

41. A boy hears the echo of his own voice from a distant hill after 0.8 second. If the speed of sound in air is 340 m/s, calculate the distance of hill from the boy. **[2]**

42. Why are the ceilings of concert halls curved? **[2]**

43. Give two practical applications of reflection of sound waves. **[2]**

44. For hearing the loudest ticking sound heard by the ear, find the angle x in the Fig. **[2]**



45. What is a soundboard? Explain the working of a soundboard with the help of a labelled diagram. **[2]**

46. When a sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound production remain the same. Do you hear echo sound on a hotter day? **[2]**

47. Why is the ceiling and wall behind the stage of good conference halls or concert halls made curved? **[2]**

48. What is reverberation? How can it be reduced? **[2]**

49. Two children are at opposite ends of an aluminium rod. One strikes the end of the rod with a stone. Find the ratio of times taken by the sound wave in air and in aluminium to reach the second child. Given velocity of sound in air and aluminium are 346 ms^{-1} and 6420 ms^{-1} respectively. **[2]**

50. What is an echo? Name two areas of its application? **[2]**

Section C

51. a. What is meant by reflection of sound? **[5]**
    b. Describe an activity to study the reflection of sound.
    c. State the laws of reflection of sound.

52. How do stethoscope and megaphone work on the principle of multiple reflections of sound? **[5]**

53. i. How will you determine the depth of a sea using echo ranging in SONAR method? **[5]**
    ii. A SONAR device on a submarine sends out a signal and receives an echo 5s later. Calculate the speed of sound in water if the distance of the object from the submarine in 2625 m.

54. i. What is the difference between echo and reverberation? **[5]**
    ii. How can we reduce reverberation in an auditorium or a big hall?
    iii. Which materials are good absorbers of sound?
    iv. Why we can hear more clearly in a room having curtains?