SECTION – I

Straight Objective Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C), (D), out of which ONLY ONE is correct. Choose the correct option.

1. *Sound travels in solids in the form of*
(a) longitudinal waves

(b) Transverse waves

(c) Stationary waves

(d) both longitudinal waves and transverse waves

2. *Transverse sound waves can propagate*
(a) only in solids *(b) only in liquids*

(c) only in gases *(d) only in vacuum*

3. *Which of the following properties of a wave, the one that is independent of the there is its*
(a) amplitude *(b) velocity*

(c) wavelength *(d) frequency*

4. *Sound energy is produced form the electric energy, the name of the device is*
(a) microphone *(b) amplifier*

(c) sonometer *(d) loud speaker*

5. *The sound waves that are used to detect the flaws in metals are known as*
(a) Sonics *(b) infrasonic*

(c) ultrasonics *(d) metasonics*

6. *Echo is due to*
(a) refraction of sound waves *(b) scattering of sound waves*

(c) reflection of sound *(d) diffraction of sound*

7. *The motion of the particles of a medium when a sound wave is passing through it is*
(a) rotatory *(b) translator* *(c) random* *(d) oscillatory*

8. *The phase relationship between two successive compression of a*

longitudinal wave is $\Delta\phi =$

(a) 360^o *(b)* 270^o *(c)* 180^o *(d)* 90^o

9. *The path relationship between the crest and immediate through is* Δl

(a) λ *(b)* $\frac{3\lambda}{4}$ *(c)* $\frac{\lambda}{2}$ *(d)* $\frac{\lambda}{4}$

10. *The frequency range of sound waves that produce the sensation of sound to human beings is*

(a) 0 Hz - 20 Hz *(b) 20 Hz - 200 Hz*

(c) 20 Hz - 20 KHz *(d) 20 KHz - 50 KHz*

11. *Sound waves are called mechanical waves because they cannot pass through*

(a) solids *(b) liquids* *(c) gases* *(d) vacuum*

12. *The waves which don't polarize are*

(a) Transverse waves *(b) Light waves*

(c) Electromagnetic waves *(d) Longitudinal waves*

13. *A tuning fork of frequency 512 Hz is vibrated the no. of vibrations produced by it within 1 seconds is*

(a) 256 *(b) 512* *(c) 1536* *(d) infinite*

14. *A tuning fork of frequency 256 Hz is set into vibratory motion, its time period is*

(a) 0.0029 s *(b) 0.0039 s* *(c) 0.0049 s* *(d) 0.0059 s*

15. *The time period of oscillation of a swing is 2 seconds, its frequency is*

(a) 5 Hz *(b) 0.5 Hz* *(c) 0.05 Hz* *(d) 0.005 Hz*

16. *A swing has a time period 1.4 seconds, the no. of oscillations made by it within 1 minute 24 seconds will be*

(a) 20 *(b) 40* *(c) 60* *(d) 80*

17. *The transmission frequency of a radio station is 102.5 kHz, the no. of electro magnetic waves that are emitted by the broadcasting station within 1 second will be*

(a) 102.5×10^3 *(b)* 10.25×10^3

(c) 1.025×10^3 *(d)* 0.1025×10^3

18. *The frequency of an electro magnetic wave is* 4.25×10^{14} *Hz, its wave length in space will be (speed of Em wave* $3\times10^{8}\ ms^{-1}$*)*

(a) $7\,\text{Å}$ *(b)* $70\,\text{Å}$ *(c)* $700\,\text{Å}$ *(d)* $7000\,\text{Å}$

19. *The wave length of mono chromatic (single colour) light is* $5000\,\text{Å}$*, its frequency will be (Speed of Em wave* $=3\times10^{8}\ ms^{-1}$*)*

(a) 6×10^{4} *Hz (b)* 6×10^{14} *Hz (c)* 0.6×10^{4} *Hz (d)* 0.6×10^{14} *Hz*

20. *A bell vibrates 600 times within* $\frac{3}{2}$ *seconds, its frequency and time period will be*

(a) 400 Hz; 0.025 s *(b) 400 Hz; 0.25 s*

(c) 400 Hz; 0.0025 s *(d) 400 Hz; 2.5 s*

21. *A school bell produces 360 waves within* $\frac{3}{5}$ *seconds, its frequency and time period will be*

(a) 0.00167 s; 600 Hz *(b) 0.0167 s; 600 Hz*

(c) 0.0167 s; 6000 Hz *(d) 0.167 s; 6000 Hz*

22. *A baby cries with a frequency 712 Hz, if the speed of sound in air is 356* ms^{-1}*, the wave length of sound is*

(a) 0.005 m (b) 0.05 m (c) 0.5 m (d) 5 m

23. *A pendulum oscillates 10 times within 2 seconds, its frequency will be*

(a) 10 Hz (b) 5 Hz (c) 15 Hz (d) 20 Hz

24. *A pendulum in a clock oscillates 240 times between 02:10 pm and 02:12 pm. Its frequency is*

(a) 200 Hz (b) 20 Hz (c) 2 Hz (d) 0.2 Hz

25. *A top makes 16 rotations about its own axis within 0.4 seconds, its frequency is*

(a) 400 Hz (b) 40 Hz (c) 4 Hz (d) 0.4 Ha

26. *In a progressive longitudinal wave the distance between at compression and immediate rarefaction is 1.6 m, its wave length is*

(a) 1.6 m (b) 2.4 m (c) 3.2 m (d) 4.8 m

27. *In a progressive longitudinal wave the separation between a compression and immediate rarefaction is 2.4 m, if its speed is* $360\ ms^{-1}$*, the frequency is*
(a) 75 Hz (b) 100 Hz (c) 125 Hz (d) 150 Hz

28. *A progressive transverse wave has a speed of* $5040\ ms^{-1}$*, its frequency is 315 Hz, then the distance between a crest and an immediate trough is*
(a) 0.8 m (b) 8 m (c) 80 m (d) 800 m

29. *A progressive transverse wave has a velocity* $4960\ ms^{-1}$*, its wave length is 0.124 m, the frequency of the wave is*
(a) $4\times10^{2}\ Hz$ *(b)* $4\times10^{3}\ Hz$ *(c)* $4\times10^{4}\ Hz$ *(d)* $4\times10^{5}\ Hz$

30. *A longitudinal wave has a time period 0.9 s, if its velocity is* $345\ ms^{-1}$*, the distance between two successive rare factions will be*
(a) 310.5 m (b) 312.5 m (c) 315.5 m (d) 317.5 m

31. *A stationary rail engine produces whistle with a frequency 2600 Hz. A person standing at a distance of 550 m from engine will listen --- no. of waves within one minute.*
(a) 26×10^{4} *(b)* 156×10^{3} *(c)* 156×10^{5} *(d)* $26\times10^{5}\ Hz$

32. *A longitudinal wave of frequency 916 Hz and wave length 38.4 cm, travel with a velocity of*
(a) $350\ ms^{-1}$ *(b)* $351\ ms^{-1}$ *(c)* $360\ ms^{-1}$ *(d)* $361\ ms^{-1}$

33. *In a transverse standing wave the separation between an antinode and the immediate node is 0.6 cm, its wave length will be*
(a) 1.2 cm (b) 1.8 cm (c) 2.4 cm (d) 3.6 cm

34. *In a transverse stationary wave each loop of length 1.8 cm, its wave length will be*
(a) 0.9 cm (b) 1.8 cm (c) 2.7 cm (d) 3.6 cm

35. *The velocity of a transverse stationary wave is* $340\ ms^{-1}$*, its frequency is 200 Hz, the distance between two successive antinodes will be*
(a) 85 cm (b) 75 cm (c) 65 cm (d) 55 cm

36. *The velocity of a transverse stationary wave is* $360\ ms^{-1}$*. Its frequency is 1.2 Hz, then the distance two successive nodes will be*
(a) 45 m (b) 30 m (c) 150 m (d) 5 m

37. *A siren has 16 holes and is making 960 revolutions per minute. The frequency of the sound produced by the siren is*

(a) 960 Hz (b) 512 Hz (c) 256 Hz (d) 128 Hz

38. *A siren has 10 holes and is making 5 revolutions within 1 second. The frequency of the sound produced by the siren is*

(a) 10 Hz (b) 25 Hz (c) 50 Hz (d) 75 Hz

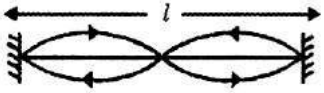
39. *The frequency of a signal is 660 Hz, if the speed of the signal is* $330\ ms^{-1}$ *, its wave length will be*

(a) 0.5 m (b) 1.0 m (c) 1.5 m (d) 2 m

40. *A wore of uniform cross-section and length of 7 m is fixed between two rigid points. If a stationary transverse wave is set in it and made to vibrate with one loop, the wave length of vibration will be*

(a) 3.5 m (b) 7 m (c) 14 m (d) 28 m

41. *A string is vibrating with two loops, if it has a length 'l', the wave length of the stationary wave will be*



(a) $\frac{l}{4}$ *(b)* $\frac{l}{2}$ *(c)* $\frac{3l}{4}$ *(d)* l

42. *In a string a stationary wave is set and it is made to vibrate with 6 loops. If the length of the string is 'l', the distance between two successive antinodes will be*

(a) $\frac{l}{2}$ *(b)* $\frac{l}{4}$ *(c)* $\frac{l}{6}$ *(d)* $\frac{l}{8}$

43. *A string of length 21 cm is vibrating with 3 loops. The separation between a node and immediate antinode will be*

(a) 3.5 cm (b) 7.0 cm (c) 10.5 cm (d) 14 cm

44. *A string has a length* $'l'$ *. A stationary wave of wave length* $'\lambda'$ *is set in it to vibrate with two loops, then the midpoint of the string becomes*

(a) an antinode (b) node

(c) neither node nor antinode (d) either node or antinode

45. *The energies that are associated with the waves in a stretched string will be*

(a) kinetic energy *(b) kinetic & potential energy*

(c) neither kinetic nor potential *(d) either kinetic or potential*

46. *The points at which particles do not vibrate, in a stationary wave are called as*

(a) antinodes *(b) crests* *(c) troughs* *(d) nodes*

47. *Choose the one, on which the frequency of a vibrating body does not depends*

(a) its elastic constants *(b) dimensions*

(c) mode of vibration *(d) medium*

48. *The musical instrument that works based on transverse waves along string is*

(a) flute *(b) guitar* *(c) key board* *(d) drums*

49. *Polarization is not observed in*

(a) longitudinal waves *(b) light waves*

(c) em waves *(d) micro waves*

50. *In a medium, the ratio which always remains constant while longitudinal waves are propagating through it is*

(a) $\frac{\lambda}{T}$ *(b)* $\frac{\lambda}{\upsilon}$ *(c)* $\frac{\upsilon}{\lambda}$ *(d)* $\frac{T}{\lambda}$

51. *The product that always remains constant, during the longitudinal wave motion through a medium is*

(a) $\upsilon\lambda$ *(b)* $T\lambda$ *(c)* $T\left(\frac{1}{\lambda}\right)$ *(d)* $\lambda\left(\frac{1}{\upsilon}\right)$

52. *The path length between two points in a wave vibrating with a phase difference of* 180^o *(or)* π *radians will be*

(a) $\frac{\lambda}{4}$ *(b)* $\frac{3\lambda}{4}$ *(c)* $\frac{\lambda}{2}$ *(d)* λ

SECTION - II

Assertion - Reason Questions

This section contains certain number of questions. Each question contains STATEMENT-1 (Assertion) and STATEMENT - 2 (Reason). Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct. Choose the correct option.

53. *STATEMENT-1: The intensity of sound is dependent on the amplitude of sound*
because
STATEMENT - 2: The intensity of sound is proportional to the square of the amplitude

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

54. *STATEMENT-1: Sound waves don't exhibit polarization*
because
STATEMENT - 2: Sound waves travel at a speed of $330\ ms^{-1}$ *in air at* 0^oC

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

55. *STATEMENT-1: A wave is a disturbance in a medium*

because

STATEMENT - 2: Wave transports matter from one place to the other.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

56. *STATEMENT-1: A wave transports matter and energy from one place to the other*

because

STATEMENT - 2: In a medium, wave motion is due to the oscillatory motion of the particles of the medium.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

57. *STATEMENT-1: The number of waves produced in unit time is called the frequency of the wave*

because

STATEMENT - 2: Frequency is the property of the source producing the waves

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a

correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

58. *STATEMENT-1: The particles of the medium when a wave propagates through it executes oscillatory motion.*
because

STATEMENT - 2: Wave carries energy and momentum.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

59. *STATEMENT-1: Sound waves cannot propagate through vacuum*
because

STATEMENT - 2: All sound waves travel with the same velocity.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

60. *STATEMENT-1: Electromagnetic waves can travel through vacuum.*
because

STATEMENT - 2: All electromagnetic waves are longitudinal in nature.

(a) Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for statement - 1

(b) Statement - 1 is True, Statement - 2 is True; Statement - 2 is NOT a correct explanation for Statement - 1

(c) Statement - 1 is True, Statement - 2 is False

(d) Statement - 1 is False, Statement - 2 is True

SECTION - III

Linked Comprehension Type

This section contains paragraphs. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (a), (b), (c) and (d), out of which ONLY ONE is correct. Choose the correct option.

A person stands at a distance of 10 m from a big wall and claps his hands. The speed of sound in air is $340\ ms^{-1}$

61. *Dos the person hear the echo of his clapping*
(a) Yes *(b) No*
(c) Can't say *(d) Information is insufficient*

62. *If the person stands at a distance of 17 m from the wall the time interval to listen echo sound after clapping*
(a) 1 s *(b) 1/2 s* *(c) 1/5 s* *(d) 1/10 s*

63. *The reflected sound will have less*
(a) frequency *(b) velocity* *(c) wave length* *(d) intensity*

Audible sound waves have frequencies ranging from 20 Hz to 20000 kHz. All the sound waves travel with the same speed ($\approx 330\ ms^{-1}$ ***) in air medium.***

64. *The wave length limits of audible sound is*
(a) 16.5 m to 0.0165 m *(b) 1.65 m to 0.0165 m*

(c) 165 m to 0.165 m (d) 16.5 m to 0.00165 m

65. The correct relation is

(a) $V = n/\lambda$ (b) $V = \lambda/n$ (c) $V = n\lambda$ (d) $V = \lambda T$

66. The energy that produces sensation of hearing is called

(a) light (b) wave (c) oscillation (d) sound

A siren has 9 holes and makes 720 revolutions per minute

67. The frequency of the sound produced by the siren is

(a) 12 Hz (b) 54 Hz (c) 108 Hz (d) 216 Hz

68. The time period of the sound is

(a) 0.0092 s (b) 0.0082 s (c) 0.0072 s (d) 0.0062 s

69. The wave length of the sound produced by the siren is $(V_{sound} = 330\ ms^{-1})$

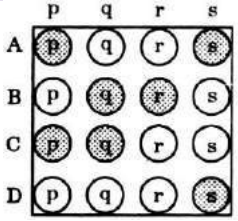
(a) 3.05 m (b) 3.15 m (c) 3.25 m (d) 3.35 m

SECTION - IV

Matrix - Match Type

This section contains Matrix-Match type questions. Each question contains statements given in two columns which have to be matched. Statements (a, b, c, d) in Column I have to be matched with statements (p, q, r, s) in Column II. The answers to these questions have to be appropriately bubbled as illustrated in the following example.

If the correct matches are a-p, a-s, b-q, b-r, c-p, c-q and d-s, then the correctly bubbled 4 x 4 matrix should be as follows:



70.

Column I	Column II
(a) Sound waves in air	(p) mechanical waves
(b) Sound waves in solids	(q) Transverse waves
(c) Sound waves in liquids	(r) Longitudinal waves
(d) Sound waves	(s) due to a vibrating source

71.

Column I	Column II
(a) Speed of sound in solids	(p) zero
(b) Speed of sound in liquids	(q) very high
(c) Speed of sound in air	(r) intermediate
(d) Speed of sound in vacuum	(s) low

72.

Column I	Column II
(a) Time period	(p) metre
(b) Frequency	(q) Hz
(c) Wave length	(r) s
(d) Amplitude	(s) $\upsilon = \frac{1}{T}$

73.

Column I	Column II
(a) node	(p) transverse wave
(b) antinode	(q) displacement from the mean point is minimum
(c) crest	(r) displacement from the mean point is maximum
(d) trough	(s) stationary wave

74.

Column I	Column II
(a) Longitudinal wave	(p) antinode
(b) Stationary wave	(q) node
(c) maximum displacement point	(r) compressions
(d) Minimum displacement point	(s) rare factions

SECTION – I
Straight Objective Type

1. *Sound waves in solids can be longitudinal (or) transverse waves.*
Hence (d) is the correct answer.

2. *Sound waves are transverse in nature in solids.*
Hence (a) is the correct answer.

3. *Amplitude, because the remaining three are related to one another.*
Hence (a) is the correct answer.

4. *Loudspeaker.*
Hence (d) is the correct answer.

5. *Ultrasonic sound waves of frequency greater than 20,000 Hz.*
Hence (c) is the correct answer.

6. *Echo is the reflected sound*
Hence (c) is the correct answer.

7. *Oscillatory motion is executed by the particles of the medium due to the waves propagation.*
Hence (d) is the correct answer.

8. *The phase angle* $\phi = 360^0$
Hence (a) is the correct answer.

9. *The path difference* $\Delta l = \frac{\lambda}{2}$
Hence (c) is the correct answer.

10. *The audible frequency range is 20 Hz – 20 kHz.*
Hence (c) is the correct answer.

11. *Sound waves cannot pass through vacuum.*
Hence (d) is the correct answer.

12. *Longitudinal waves cannot be polarized.*
Hence (d) is the correct answer.

13. $\upsilon = 512\,Hz$; *frequency is 512 Hz, means it produces 512 vibrations per second.*
Hence (b) is the correct answer.

14. $T = \dfrac{1}{256\ s^{-1}} = 0.0039\,s$.
Hence (b) is the correct answer.

15. $T = 2s;\ \upsilon = \dfrac{1}{T} = 0.5Hz$
Hence (b) is the correct answer.

16. $T = 1.4\ s$
no. of oscillations $= \dfrac{time}{T}$
$= \dfrac{84}{1.4} = 60$
Hence (c) is the correct answer.

17. $\upsilon = 102.5\ kHz$
no. of waves with in 1 second
102.5×10^3
Hence (a) is the correct answer.

18. $\upsilon = 4.2 \times 10^{14}\,Hz$
$\lambda = \dfrac{c}{\upsilon} = \dfrac{3 \times 10^8\,ms^{-1}}{4.2 \times 10^{14}\,ms^{-1}} \approx 7000\,\text{Å}$

Hence (d) is the correct answer.

19. $\lambda = 5000\,\text{Å}$

$$\upsilon = \frac{c}{\lambda} = \frac{3\times10^{8}\,ms^{-1}}{5000\times10^{-10}\,m} = 6\times10^{14}\,Hz$$

Hence (b) is the correct answer.

20. $$\upsilon = \frac{600}{1.5s} = 400Hz$$

$$T = \frac{1}{400}Hz = 0.0025\,s$$

Hence (c) is the correct answer.

21. $$\upsilon = \frac{360}{\frac{3}{5}s} = \frac{360\times5}{3s} = 600Hz$$

$$T = \frac{1}{\upsilon} = \frac{1}{600Hz} = 0.00167s$$

Hence (a) is the correct answer.

22. $\upsilon = 712\,Hz$

$V = 356\ ms^{-1}$

$$\lambda = \frac{V}{\upsilon} = \frac{356\ ms^{-1}}{712Hz} = 0.5m$$

Hence (c) is the correct answer.

23. $$\upsilon = \frac{10}{2s} = 5Hz$$

Hence (b) is the correct answer.

24. $\upsilon = \frac{240}{2 \times 60} = 2Hz$

Hence (c) is the correct answer.

25. $\upsilon = \frac{16}{0.45} = 40Hz$

Hence (b) is the correct answer.

26. $\frac{\lambda}{2} = 1.6m \Rightarrow \lambda = 3.2m$

Hence (c) is the correct answer.

27. $\frac{\lambda}{2} = 2.4m \Rightarrow \lambda = 4.8m$

$V = 360\,ms^{-1}$

$\upsilon = \frac{V}{\lambda} = \frac{360\,ms^{-1}}{4.8\,m} = 75Hz$

Hence (a) is the correct answer.

28. $V = 5040\,ms^{-1}$

$\lambda = 315Hz$

$\lambda = \frac{V}{\upsilon} = \frac{5040\ ms^{-1}}{315Hz} = 16m$

$\therefore \frac{\lambda}{2} = 8m$

Hence (b) is the correct answer.

29. $V = 4960\ ms^{-1}$

$\lambda = 0.124m$

$\upsilon = \frac{V}{\lambda} = \frac{4960\ ms^{-1}}{0.124\,m} = 4 \times 10^4\,Hz$

Hence (c) is the correct answer.

30. $T = 0.9s \Rightarrow \upsilon = \dfrac{1}{0.9s} = 1.11Hz$

$V = 345ms^{-1}$

$\lambda = \dfrac{V}{\upsilon} = \dfrac{345ms^{-1}}{1.11Hz} = 310.5m$

Hence (a) is the correct answer.

31. $\upsilon = 2600Hz$

Frequency means no. of waves emitted per second.

2600 waves ..... 1 s

? ..... 60 s

no. of waves $= 2600 \times 60$

$= 156000 = 156 \times 10^3$

Hence (b) is the correct answer.

32. $\upsilon = 916Hz$

$\lambda = 38.4cm$

$V = (916Hz)(0.384m) \approx 351ms^{-1}$

Hence (b) is the correct answer.

33. $\dfrac{\lambda}{4} = 0.6cm$

$\lambda = 2.4cm$

Hence (c) is the correct answer.

34. $\dfrac{\lambda}{2} = 1.8cm$

$\lambda = 3.6cm$

Hence (d) is the correct answer.

35. $V = 340ms^{-1}$

υ = *200 Hz*

$$\lambda = \frac{340 ms^{-1}}{200 s^{-1}} = 1.7 m$$

Hence (a) is the correct answer.

36. $V = 360 ms^{-1}$

$\upsilon = 1.2 Hz$

$$\lambda = \frac{360 ms^{-1}}{1.2 s^{-1}} = 300 m$$

$$\frac{\lambda}{2} = 150 m$$

Hence (c) is the correct answer.

37. $$\upsilon = \frac{960}{60} = 16 Hz \text{ per one hole}$$

Total frequency
= (no. of holes) (frequency per hole)
= (16) (16) Hz
= 256 Hz

Hence (c) is the correct answer.

38. $$\upsilon = 10 \times \frac{5}{1s} = 50 Hz$$

Hence (c) is the correct answer.

39. $\upsilon = 660$ Hz

$V = 330 ms^{-1}; \lambda = 0.5 m$

Hence (a) is the correct answer.

40. $$\frac{\lambda}{2} = 7m \Rightarrow \lambda = 14 m$$

Hence (c) is the correct answer.

41. *Here* $l = \frac{\lambda}{2} + \frac{\lambda}{2}$

$\Rightarrow \lambda = l$

Hence (d) is the correct answer.

42. $l = 6 \times \frac{\lambda}{2} \Rightarrow \lambda = \frac{l}{3} \Rightarrow \frac{\lambda}{2} = \frac{l}{6}$

Hence (c) is the correct answer.

43. $l = 21cm$

$l = 3 \times \frac{\lambda}{2}$

$21\,cm = 3 \times \frac{\lambda}{2}$

$\therefore \lambda = 14cm$

$\frac{\lambda}{4} = 3.5\,cm$

Hence (a) is the correct answer.

44. *Node.*

Hence (b) is the correct answer.

45. *Kinetic & potential energies.*

Hence (b) is the correct answer.

46. *Node.*

Hence (d) is the correct answer.

47. *Medium*

Hence (d) is the correct answer.

48. *Guitar.*

Hence (b) is the correct answer.

49. *Longitudinal waves*
Hence (a) is the correct answer.

50. $\frac{\lambda}{T} \Rightarrow \upsilon\lambda \Rightarrow$ *waves velocity (v) remains constant.*
Hence (a) is the correct answer.

51. $\upsilon\lambda = V \Rightarrow$ *wave velocity*
Hence (a) is the correct answer.

52. *Phase difference* 180^o *corresponds to a path difference of* $\frac{\lambda}{2}$.
Hence (c) is the correct answer.

SECTION - II
Assertion - Reason Questions

53. *Because both statement are correct and statement – 2 explains statement -1*
Hence (a) is the correct answer.

54. *Because both statements are correct and individual*
Hence (b) is the correct answer.

55. *Wave never transports matter.*
Hence (c) is the correct answer.

56. *Wave never carry matter.*
Hence (d) is the correct answer.

57. *Both statements are correct and describe the properties of frequency.*
Hence (b) is the correct answer.

58. *Due to the distribution of energy particles in medium execute oscillations.*
Hence (a) is the correct answer.

59. *Both are correct and independent statements.*
Hence (b) is the correct answer.

60. *εm waves have transverse nature.*
Hence (c) is the correct answer.

SECTION - III
Linked Comprehension Type

61. *To listen echo there should be a minimum distance of 16.5 m separation is required between obstacle and observer.*
Hence (b) is the correct answer.

62. $t = \dfrac{34\,m}{340\,ms^{-1}} \Rightarrow t = \dfrac{1}{10}s$
Hence (d) is the correct answer.

63. *Intensity decreases due to reflection.*
Hence (d) is the correct answer.

64. $\lambda_{max} = \dfrac{V}{\upsilon_{min}}; \lambda_{min} = \dfrac{V}{\upsilon_{max}}$
Hence (a) is the correct answer.

65. $V = n\lambda$
Hence (c) is the correct answer.

66. *Sound.*
Hence (d) is the correct answer.

67. $\upsilon = \frac{720}{60\,s^{-1}} = 12Hz;$

Frequency of siren $= 9 \times 12 = 108\,Hz$

Hence (c) is the correct answer.

68. $T = \frac{1}{108\,Hz} = 0.0092\,s\,.$

Hence (a) is the correct answer.

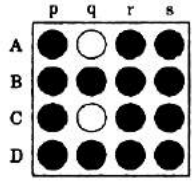
69. $\lambda = \frac{330\,ms^{-1}}{108Hz} = 3.05\,m\,.$

Hence (a) is the correct answer.

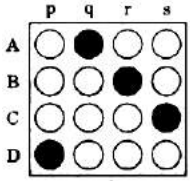
SECTION - IV

Matrix - Match Type

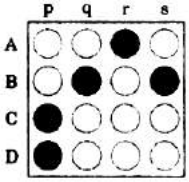
70.



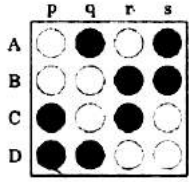
71.



72.



73.



74.