Founders :

Muhammad Kamran

Fizza Marium

Motto :

"We are saviour of nation."

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medicoshub.org@gmail.com

fizzamarium777@gmail.com

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STARS ACADEMY LAHORE

Head office: 590-Q Main Boulevard, Johar Town Lahore, 0321-9432186, 0321-4693044, www.stars.edu.pk

Roll No. of Candidate

Name of Candidate

STARS ENTRY TEST SYSTEM-2020
ONLINE SESSION - MDCAT

Test Code: P5 (Waves) **Time Allowed: 40 mins**

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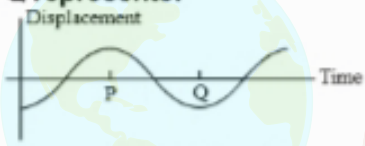
1. Which of the following statements is wrong
A) Sound travels in straight line
B) Sound is a form of energy
C) Sound travels in the form of waves
D) Sound travels faster in vacuum than in air

2. Ultrasonic, Infrasonic and audible waves travel through a medium with speeds v_u, v_i and v_a respectively, then
A) v_u, v_i and v_a are equal
B) $v_a \geq v_i \geq v_a$
C) $v_u \leq v_a \leq v_i$
D) $v_a \leq v_u$ and $v_u \approx v_i$

3. A tuning fork makes 256 vibrations per second in air. When the velocity of sound is 330 m/s, then wavelength of the tone emitted is;
A) 0.56 m
B) 1.11 m
C) 0.89 m
D) 1.29 m

4. In the diagram below, the interval PQ represents:



A) wavelength/2
B) 2 × amplitude
C) wavelength
D) period/2

5. The relation between phase difference ($\Delta\phi$) and path difference (Δx) is
A) $\Delta\phi = \frac{2\pi}{\lambda}\Delta x$
B) $\Delta\phi = \frac{2\pi\lambda}{\Delta x}$
C) $\Delta\phi = 2\pi\lambda\Delta x$
D) $\Delta\phi = \frac{2\Delta x}{\lambda}$

6. In a medium sound travels 2 km in 3 sec and in air, it travels 3 km in 10 sec. The ratio of the wavelengths of sound in the two media is
A) 1 : 8
B) 8 : 1
C) 1 : 18
D) 20 : 9

7. Frequency range of the audible sounds is
A) 0 Hz – 30 Hz
B) 20 kHz – 20,000 kHz
C) 20 Hz – 20 kHz
D) 20 kHz – 20 MHz

8. If velocity of sound in a gas is 360 m/s and the distance between a compression and the nearest rarefaction is 1m, then the frequency of sound is
A) 90 Hz
B) 360 Hz
C) 180 Hz
D) 720 Hz

9. The wave length of light in visible part (λ_v) and for sound (λ_s) are related as
A) $\lambda_v > \lambda_s$
B) $\lambda_v = \lambda_s$
C) $\lambda_s > \lambda_v$
D) $\lambda_v \leq \lambda_s$

10. When sound waves travel from air to water, which of the following remains constant
A) Velocity
B) Wavelength
C) Frequency
D) All the above

11. The phase difference between two points separated by 1m in a wave of frequency 120 Hz is 90°. The wave velocity is
A) 180 m/s
B) 480 m/s
C) 240 m/s
D) 720 m/s

12. The frequency of a sound wave is n and its velocity is v. If the frequency is increased to 4*n*, the velocity of the wave will be

A) v
B) 4*v*
C) 2*v*
D) *v* /4

13. The speed of a wave in a certain medium is 960 m/s. If 3600 waves pass over a certain point of the medium in 1 minute, the wavelength is

A) 2 metres
B) 8 metres
C) 4 metres
D) 16 metres

14. Two sound waves having a phase difference of 60° have path difference of

A) 2λ
B) λ/6
C) λ/2
D) λ/3

15. Water waves are

A) Longitudinal
B) Transverse
C) Both longitudinal and transverse
D) Neither longitudinal nor transverse

16. A medium can carry a longitudinal wave because it has the property of

A) Mass
B) Compressibility
C) Density
D) Elasticity

17. Which of the following is not the transverse wave

A) X-rays
B) Visible light wave
C) γ-rays
D) Sound wave in a gas

18. A travelling wave passes a point of observation. At this point, the time interval between successive crests is 0.2 seconds and

A) The wavelength is 5 m
B) The frequency is 5 Hz
C) The velocity of propagation is 5 m/s
D) The wavelength is 0.2 m

19. A wave is reflected from a rigid support. The change in phase on reflection will be

A) π / 4
B) π
C) π/ 2
D) 2π

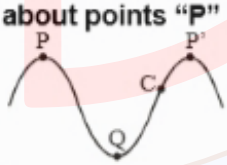
20. If the phase difference between the two wave is 2π during superposition, then the resultant amplitude is

A) Maximum
B) Maximum or minimum
C) Minimum
D) None of the above

21. The intensity ratio of two waves is 1 : 16. The ratio of their amplitudes is

A) 1 : 16
B) 4 : 1
C) 1 : 4
D) 2 : 1

22. When the wave propagates, what is true about points "P" and "C" in the below figure?



A) They are always in-phase with each other
B) Sometimes in-phase but sometimes out-of-phase
C) They are always out-of-phase with each other
D) neither in-phase nor out-of-phase

23. Two tuning forks when sounded together produced 4 beats/sec. The frequency of one fork is 256. The number of beats heard increases when the fork of frequency 256 is loaded with wax. The frequency of the other fork is

A) 504
B) 260
C) 520
D) 252

24. Beats are the result of

A) Diffraction
B) Destructive interference
C) Constructive and destructive interference
D) Superposition of two waves of nearly equal frequency

25. The distance between the nearest node and antinode in a stationary wave is

A) λ
B) λ/4
C)λ/2
D) 2λ

26. Which of the property makes difference between progressive and stationary waves
A) Amplitude
B) Propagation of energy
C) Frequency
D) Phase of the wave

27. Stationary waves are formed when
A) Two waves of equal amplitude and equal frequency travel along the same path in opposite directions
B) Two waves of different wavelength and equal amplitude travel along the same path with equal speeds in opposite directions
C) Two waves of equal wavelength and equal phase travel along the same path with equal speed
D) Two waves of equal amplitude and equal speed travel along the same path in opposite direction

28. In a stationary wave, all particles are
A) At rest at the same time twice in every period of oscillation
B) At rest at the same time only once in every period of oscillation
C) Never at rest at the same time
D) Never at rest at all

29. Stationary waves of frequency 300 Hz are formed in a medium in which the velocity of sound is 1200 metre/sec. The distance between a node and the neighbouring antinode is
A) 1 m
B) 3 m
C) 2 m
D) 4 m

30. Energy is not carried by which of the following waves
A) Stationary
B) Transverse
C) Progressive
D) Electromagnetic

31. In stationary waves
A) Energy is uniformly distributed
B) Energy is minimum at nodes and maximum at antinodes
C) Energy is maximum at nodes and minimum at antinodes
D) Alternating maximum and minimum energy producing at nodes and antinodes

32. A string fixed at both the ends is vibrating in two segments. The wavelength of the corresponding wave is
A) $\ell/4$
B) ℓ
C) $\ell/2$
D) 2ℓ

33. A 1 cm long string vibrates with fundamental frequency of 256 Hz. If the length is reduced to 1/4 *cm* keeping the tension unaltered, the new fundamental frequency will be
A) 64
B) 512
C) 256
D) 1024

34. Standing waves are produced in a 10 m long stretched string. If the string vibrates in 5 segments and the wave velocity is 20 m/s, the frequency is
A) 2 Hz
B) 5 Hz
C) 4 Hz
D) 10 H

35. The velocity of waves in a string fixed at both ends is 2 m/s. The string forms standing waves with nodes 5.0 cm apart. The frequency of vibration of the string in Hz is
A) 40
B) 20
C) 30
D) 10

36. If vibrations of a string are to be increased by a factor of two, then tension in the string must be made
A) Half
B) Four times
C) Twice
D) Eight times

37. Four wires of identical length, diameters and of the same material are stretched on a sonometre wire. If the ratio of their tensions is 1 : 4 : 9 : 16 then the ratio of their fundamental frequencies are
A) 16 : 9 : 4 : 1
B) 1 : 4 : 2 : 16
C) 4 : 3 : 2 : 1
D) 1 : 2 : 3 : 4

38. If you set up the seventh harmonic on a string fixed at both ends, how many nodes and antinodes are set up in it
A) 8, 7
B) 8, 9
C) 7, 7
D) 9, 8

39. If you set up the ninth harmonic on a string fixed at both ends, its frequency compared to the seventh harmonic
A) Higher
B) Equal
C) Lower
D) None of the above

40. **A tube closed at one end and containing air is excited. It produces the fundamental note of frequency 512 Hz. If the same tube is open at both the ends the fundamental frequency that can be produced is**
A) 1024 Hz
B) 256 Hz
C) 512 Hz
D) 128 Hz

41. **A closed pipe and an open pipe have their first overtones identical in frequency. Their lengths are in the ratio**
A) 1 : 2
B) 3 : 4
C) 2 : 3
D) 4 : 5

42. **An air column in a pipe, which is closed at one end, will be in resonance with a vibrating body of frequency 166 Hz, if the length of the air column is (speed of sound = 332 m/s)**
A) 2.00 m
B) 1.00 m
C) 1.50 m
D) 0.50 m

43. **If the length of a closed organ pipe is 1m and velocity of sound is 330 m/s, then the frequency for the second note is**
A) $4 \times \frac{330}{4} Hz$
B) $2 \times \frac{330}{4} Hz$
C) $3 \times \frac{330}{4} Hz$
D) $2 \times \frac{4}{330} Hz$

44. **The fundamental note produced by a closed organ pipe is of frequency *f*. The fundamental note produced by an open organ pipe of same length will be of frequency**
A) f/2
B) 2 *f*
C) *f*
D) 4 *f*

45. **An organ pipe P_1 closed at one end vibrating in its first overtone and another pipe P_2 open at both ends vibrating in its third overtone are in resonance with a given tuning fork. The ratio of lengths of P_1 and P_2 is**
A) 1 : 2
B) 3 : 8
C) 1 : 3
D) 3 : 4

46. **A resonance air column closed at one end of length 20 cm resonates with a tuning fork of frequency 250 Hz. The speed of sound in air is**
A) 300 m/s
B) 150 m/s
C) 200 m/s
D) 75 m/s

47. **If the length of a closed organ pipe is 1.5 m and velocity of sound is 330 m/s, then the frequency for the second note is**
A) 220 Hz
B) 110 Hz
C) 165 Hz
D) 55 Hz

48. **Doppler shift in frequency does not depend upon**
A) The frequency of the wave produced
B) The velocity of the source
C) The velocity of the observer
D) Distance from the source to the listener

49. **A source of sound of frequency 450 cycles/sec is moving towards a stationary observer with 34 m/sec speed. If the speed of sound is 340 m/sec, then the apparent frequency will be**
A) 410 cycles/sec
B) 550 cycles/sec
C) 500 cycles/sec
D) 450 cycles/sec

50. **The wavelength is 120 cm when the source is stationary. If the source is moving with relative velocity of 60 m/sec towards the observer, then the wavelength of the sound wave reaching to the observer will be (velocity of sound = 330 m/s)**
A) 98 cm
B) 120 cm
C) 140 cm
D) 144 cm

51. **The frequency of a whistle of an engine is 600 cycles/sec is moving with the speed of 30 m/sec towards an observer. The apparent frequency will be (velocity of sound = 330 m/s)**
A) 600 cps
B) 990 cps
C) 660 cps
D) 330 cps

52. **Which one of the following media can transmit both transverse and longitudinal waves:**
A) Solid
B) Liquid
C) Gas
D) Plasma

53. **The Doppler's effect is applicable for**
A) Light waves
B) Space waves
C) Sound waves
D) Both A and C

54. A source of sound emits waves with frequency f Hz and speed v m/sec. Two observers move away from this source in opposite directions each with a speed 0.2 V relative to the source. The ratio of frequencies heard by the two observers will be

A) 3 : 2
B) 1 : 1
C) 2 : 3
D) 4 : 10

55. An observer is moving towards the stationary source of sound, then

A) Apparent frequency will be less than the real frequency
B) Apparent frequency will be greater than the real frequency
C) Apparent frequency will be equal to real frequency
D) Only the quality of sound will change

56. Doppler's effect will not be applicable when the velocity of sound source is

A) Equal to that of the sound velocity
B) Less than the velocity of sound
C) Greater than the velocity of sound
D) Zero

57. A source of sound is moving with constant velocity of 20 m/s emitting a note of frequency 1000 Hz. The ratio of frequencies observed by a stationary observer while the source is approaching him and after it crosses him will be(Speed of sound v= 340 m/s)

A) 9 : 8
B) 1 : 1
C) 8 : 9
D) 9 : 10

58. Wave which cannot travel in vacuum is

A) X-rays
B) Ultraviolet
C) Infrasonic
D) Radiowaves

59. The speed of electromagnetic wave in vacuum depends upon the source of radiation

A) Increases as we move from γ-rays to radio waves
B) Decreases as we move from γ-rays to radio waves
C) Is same for all of them
D) None of these

60. If $\vec{E}$ and $\vec{B}$ are the electric and magnetic field vectors of E.M. waves then the direction of propagation of E.M. wave is along the direction of

A) $\vec{E}$
B) $\vec{E} \times \vec{B}$
C) $\vec{B}$
D) None of these

Medicos Hub Phy Test #6 Key

Key

1.	D	17.	D	33.	D	49.	C	65.		81.		97.	
2.	A	18.	B	34.	B	50.	A	66.		82.		98.	
3.	D	19.	B	35.	B	51.	C	67.		83.		99.	
4.	D	20.	A	36.	B	52.	A	68.		84.		100.	
5.	A	21.	C	37.	D	53.	D	69.		85.		101.	
6.	D	22.	C	38.	D	54.	B	70.		86.		102.	
7.	C	23.	B	39.	A	55.	B	71.		87.		103.	
8.	C	24.	D	40.	A	56.	C	72.		88.		104.	
9.	C	25.	B	41.	A	57.	A	73.		89.		105.	
10.	C	26.	B	42.	D	58.	C	74.		90.		106.	
11.	B	27.	A	43.	C	59.	C	75.		91.		107.	
12.	B	28.	A	44.	B	60.	B	76.		92.		108.	
13.	D	29.	A	45.	B	61.		77.		93.		109.	
14.	B	30.	A	46.	C	62.		78.		94.		110.	
15.	C	31.	B	47.	C	63.		79.		95.		111.	
16.	D	32.	B	48.	D	64.		80.		96.		112.	