

GRAND TEST

- 1. A physical system undergoing forced vibrations is called**

(a) harmonic oscillator (b) driven oscillator
(c) damped oscillator (d) all of these
- 2. The waves produced in a microwave oven have a frequency equal to**

(a) 2450 Hz (b) 2450 kHz
(c) 2450 MHz (d) none of these
- 3. On increasing the amplitude of an oscillator twice, its energy**

(a) increases two times (b) decreases two times
(c) decreases four times (d) increases four times
- 4. The SI unit of force constant is the same as that of**

(a) force (b) pressure
(c) surface tension (d) stress
- 5. The instantaneous kinetic energy of a mass-spring system oscillating with an amplitude x_0 is equal to**

(a) $\frac{1}{2}k(x^2 - x_0^2)$ (b) $\frac{1}{2}k(x^2 + x_0^2)$
(c) $\frac{1}{2}kx^2(1 - x_0^2)$ (d) $\frac{1}{2}kx_0^2\left(1 - \frac{x^2}{x_0^2}\right)$
- 6. The instantaneous velocity of a vibrating mass-spring system is**

(a) $v = x_0 \sqrt{\frac{m}{k}} \sqrt{1 - \frac{x^2}{x_0^2}}$ (b) $v = x_0 \sqrt{\frac{k}{m}} \sqrt{1 - \frac{x^2}{x_0^2}}$
(c) $v = x_0 \sqrt{\frac{m}{k}} \sqrt{1 - \frac{x_0^2}{x^2}}$ (d) $v = x \sqrt{\frac{m}{k}} \sqrt{1 - \frac{x^2}{x_0^2}}$
- 7. The maximum velocity of a vibrating mass-spring system having amplitude x_0 is**

(a) $v_0 = x_0 \sqrt{\frac{k}{m}}$ (b) $v_0 = x \sqrt{\frac{k}{m}}$

$$(c) v_o = x_o \sqrt{\frac{m}{k}}$$

$$(d) v_o = x \sqrt{\frac{m}{k}}$$

- 8. When a particle is in uniform circular motion, its projection along the diameter axis executes**
(a) linear motion (b) circular motion
(c) vibratory motion (d) simple harmonic motion
- 9. On shifting a simple pendulum from pole to equator, we notice**
(a) an increase in its time period
(b) a decrease in its time period
(c) a change in its mass
(d) no change either in mass or time period
- 10. A block of mass m is in uniform SHM when attached vertically with two springs, each of spring constant k , when joined length wise with a time period**
(a) $T = 2\pi\sqrt{\frac{m}{k}}$ (b) $T = 2\pi\sqrt{\frac{2m}{k}}$
(c) $T = 2\pi\sqrt{\frac{m}{2k}}$ (d) $T = 2\pi\sqrt{\frac{k}{m}}$
- 11. What happens to the time period of a mass-spring system if the spring is replaced by a more stiff spring?**
(a) Increases (b) Decreases
(c) Remains the same (d) Can not be predicted.
- 12. The amplitude of a forced oscillator depends upon the**
(a) natural frequency of the oscillator
(b) frequency of the driving force
(c) amount of damping present
(d) all of these
- 13. A shock absorber is a**
(a) harmonic oscillator (b) driven oscillator
(c) damped oscillator (d) all of these
- 14. In damped harmonic oscillator, the loss of energy is due to**
(a) the decrease in frequency of the oscillator
(b) an increase of its time period
(c) a decrease in its amplitude
(d) all of these
- 15. Sound waves do not travel in vacuum because these are**

- (a) longitudinal waves (b) composed of compressions
(c) mechanical waves (d) low frequency waves
- 16. In a stationary wave, the antinodes are located at**
(a) the ends (b) the middle
(c) between nodes (d) anywhere
- 17. A simple pendulum suspended from the ceiling in an elevator has time period T when the elevator is at rest. When the elevator falls freely, its time period becomes**
(a) $\frac{L}{g}$ (b) $\frac{T}{g}$
(c) zero (d) infinite
- 18. When two identical waves are superimposed on each other, the velocity of the resultant wave**
(a) decreases (b) increases
(c) remains the same (d) becomes zero
- 19. Set of frequencies which are an integral multiple of the fundamental frequency are called**
(a) beat frequencies (b) driving frequencies
(c) natural frequencies (d) overtones
- 20. The speed of sound in a medium depends upon**
(a) elasticity of the medium (b) density of the medium
(c) amplitude of sound (d) both 'a' and 'b'
- 21. Which one of the following properties of sound is affected by a change in the temperature of air?**
(a) Frequency (b) Amplitude
(c) Wavelength (d) Intensity
- 22. When a wave enters a medium, which of its following parameters remains unchanged?**
(a) Wavelength (b) Speed
(c) Frequency (d) Intensity
- 23. The speed of distant stars and galaxies can be calculated by the use of**
(a) Doppler's effect (b) radar
(c) relativity (d) all of these
- 24. Light reaches Earth from the Sun in about**
(a) 15 $\frac{1}{2}$ minutes (b) 10 minutes
(c) 8 $\frac{1}{2}$ minutes (d) 6 $\frac{1}{2}$ minutes

- 25. The danger signals are red while the eye is most sensitive to yellow because**
(a) scattering of yellow colour is less than that of red
(b) red light is longer in wavelength than yellow light
(c) scattering in red is less than in yellow
(d) red colour is more intense than yellow
- 26. The spreading of light after passing through a pinhole is called**
(a) dispersion (b) scattering
(c) diffraction (d) all of these
- 27. The minimum distance between an object and its real image in a convex lens is**
(a) $2f$ (b) $3f$
(c) $4f$ (d) $6f$
- 28. When a convex lens of focal length f is immersed in a liquid of refractive index n less than that of the lens, then its focal length**
(a) decreases (b) increases
(c) remains the same (d) becomes the same
- 29. The ability of an instrument to reveal the minor details of an object is its**
(a) resolution (b) magnification
(c) resolving power (d) none of these
- 30. The resolving power of an astronomical telescope depends upon**
(a) the focal length of the objective
(b) the focal length of eyepiece
(c) the diameter of the objective lens.
(d) the diameter of the eyepiece lens
- 31. Multimode step index fibre is useful for**
(a) long distance
(b) short distance
(c) neither long nor short distance
(d) neither of these
- 32. The disadvantages of a step index fibre can be overcome by using**
(a) impurities in the fibre (b) graded index fibre

(c) a highly pure glass (d) none of these

33. The unit of magnifying power is

- (a) joule (b) watt
(c) diopter (d) no unit

34. The focal length and radius of curvature of a lens are related by

- (a) $f = 2R$ (b) $R = 2f$
(c) $R = f$ (d) none of these

35. The Avogadro number represents the number of atoms in

- (a) 1 kg of a substance (b) unit volume of a substance
(c) 1 mole of a substance (d) total amount of a substance

36. Molecules of a mono atomic gas possess

- (a) rotational motion (b) vibrational motion
(c) translational motion (d) all of these

37. A closed system is one in which

- (a) the energy of the system remains constant
(b) the mass of the system remains the same
(c) both mass and energy of the system remain the same
(d) neither mass nor energy remain the same

38. In a thermodynamical process the change in internal energy depends upon

- (a) the initial state only
(b) the final state only
(c) the path followed by the change
(d) the initial and the final state

39. The equation $PV^\gamma = \text{constant}$ holds in

- (a) isothermal process (b) isochoric process
(c) adiabatic process (d) all of these

40. In a Carnot engine, the final temperature of the working substance is

- (a) greater than its initial temperature
(b) smaller than its initial temperature
(c) equal to its initial temperature
(d) zero

41. The working substance of a Carnot engine is

- (a) source (b) sink

- (c) petrol (d) ideal gas

42. Upon decreasing the temperature of the sink, the efficiency of the Carnot engine

- (a) decreases (b) does not change
(c) increases (d) none of these

43. When the temperature of source and the sink become equal the change in entropy of a Carnot engine becomes

- (a) zero (b) minimum
(c) maximum (d) negative

44. All real heat engines are less efficient than a Carnot engine due to

- (a) working substance
(b) temperature of the reservoirs
(c) friction and heat losses
(d) all of these

45. The unit of thermodynamic temperature is

- (a) K (b) °F
(c) °C (d) none of these

46. Any temperature T in Kelvin scale reads _____ on thermodynamical scale as

- (a) $T = 273.16 \frac{Q_3}{Q}$ (b) $T = 273.16 \frac{Q}{Q_3}$
(c) $T = 373.16 \frac{Q_3}{Q}$ (d) $T = 373.16 \frac{Q}{Q_3}$

47. Human metabolism provides a good example of

- (a) mass conservation
(b) energy conservation
(c) entropy conservation
(d) none of these

48. The increase in thermal pollution of environments means

- (a) a decrease in entropy
(b) an increase in entropy
(c) constant entropy
(d) none of these

49. Upon shifting a simple pendulum from Karachi to Mount Everest, its natural frequency

- (a) increases (b) decreases

(c) remains the same (d) none of these

50. Under similar conditions of temperature and pressure, the velocity of sound will be maximum in

- (a) oxygen (b) hydrogen.
(c) nitrogen (d) carbon dioxide

51. Presence of moisture in air

- (a) increases the velocity of sound
(b) decreases the velocity of sound
(c) has no effect on the speed of sound
(d) none of these

52. A string of length l fixed at both ends is plucked from its middle so that it vibrates in one loop. The wavelength of the wave in this mode is

- (a) $l/2$ (b) l
(c) $2l$ (d) $l/4$

53. The ratio of the fundamental frequency of a organ pipe open at both ends to an organ pipe closed at both ends is

- (a) 2:1 (b) 1:2
(c) 1:1 (d) 3:1

54. When a simple pendulum swings, which of the following quantities is not zero throughout the motion?

- (a) Acceleration (b) Speed
(c) Weight (d) Momentum

55. A string with one end fixed is being whirled from the other free end so that it vibrates with the fundamental frequency of 20 Hz. Its next harmonic has a frequency equal to

- (a) 40 Hz (b) 60 Hz
(c) 10 Hz (d) neither of these

56. In an interference pattern

- (a) bright fringes are wider than dark fringes
(b) dark fringes are wider than the bright fringes
(c) both dark and bright fringes are of equal width
(d) none of these

57. In a diffraction pattern, the fringes are

- (a) equally spaced
(b) wider near the object and narrower away from it
(c) narrower near the object and wider away from it

(d) none of these

58. The Celsius and Fahrenheit scales have the same reading at

(a) 40°

(b) 140°

(c) -40°

(d) -140°

59. Absolute zero is considered to be the temperature at which

(a) all gases become liquid

(b) all liquids become solid

(c) water freezes

(d) molecular motion in gases ceases

60. Which of the followings do not have the same units?

(a) Mechanical energy

(b) Kinetic energy

(c) Heat energy

(d) Power

KEY TO GRAND TEST CHAPTERS 7 -11

1	b	21	c	41	d
2	c	22	c	42	c
3	d	23	a	43	c
4	c	24	c	44	c
5	d	25	b	45	a
6	b	26	c	46	b
7	a	27	c	47	b
8	d	28	b	48	b
9	a	29	c	49	b
10	b	30	c	50	b
11	b	31	a	51	b
12	d	32	b	52	c
13	c	33	c	53	a
14	d	34	b	54	c
15	c	35	c	55	b
16	c	36	c	56	c
17	d	37	c	57	b
18	c	38	d	58	c
19	d	39	c	59	D
20	d	40	c	60	D