

BHU PHYSICS Question Paper

1. The radius of curvature of a spherical surface is measured using

- A. a spherometer
- B. spectrometer
- C. screw gauge
- D. slide calipers

2. If the dimensions of length are expressed as $G^x C^y h^z$, where G , C , h are universal gravitational constant, speed of light and Planck's constant respectively, then

- A. $x = 1/2, y = 1/2$
- B. $x = 1/2, z = 1/2$
- C. $y = 1/2, z = 3/2$
- D. $y = + 3/2, z = 1/2$

3. The dimensional formula of electric field strength is:

- A. $MLT^{-2}I^{-1}$
- B. $MLT^{-3}A^{-1}$
- C. $T^{-2}A^{-1}$
- D. $MLTA^{-2}$

4. A man throws a ball in air in such a way that when the ball is in its maximum height he throws another ball. If the balls are thrown after the time difference of 1 sec, then what will be the height attained by them

- A. 19.6 m
- B. 9.8 m

C. 4.9 m

D. 2.45 m

5. If the velocity time graph of a body is a straight line sloping downwards, the body has

A. acceleration

B. deceleration

C. zero acceleration

D. constant acceleration

6. Which one of the following equations represents the motion of body with finite constant acceleration?

A. $y = at$

B. $y = at + bt^2$

C. $y = at + bt^2 + ct^3$

D. $y = at + bt$

7. What is the magnitude of the velocity of the body when it is projected horizontally from a point above the ground after 0.2 seconds?

A. $\sqrt{2} \text{ ms}^{-1}$

B. $2\sqrt{2} \text{ ms}^{-1}$

C. $3\sqrt{2} \text{ ms}^{-1}$

D. $4\sqrt{2} \text{ ms}^{-1}$

8. A string can withstand a tension of 25 N. What is the greatest speed at which a body of mass 1 kg can be whirled in a horizontal circle using 1 m length of the string?

A. 25 ms^{-1}

B. 5 ms^{-1}

C. 75 ms^{-1}

D. 10 ms^{-1}

9. An object tied to a piece of string is whirled in a vertical circle, at constant speed. The tension in the string is maximum at

A. A

B. B

C. C

D. D

10. The maximum force of friction that comes into play is called

A. limiting friction

B. kinetic friction

C. static friction

D. minimum friction

11. A body of mass 5 Kg is raised vertically to a height of 10 m by a force of 170 N . The final velocity of the body is

A. 15 ms^{-1}

B. 17 ms^{-1}

C. 20 ms^{-1}

D. 22 ms^{-1}

12. A cyclist moving at a speed of 17.64 km/h describes a circle of radius 9.8 m . If the cyclist is held in balance, the co-efficient of friction between the tyre and the ground is

A. 0.25

B. 0.29

C. 0.36

D. 0.35

13. Two bodies with masses m_1 and m_2 have equal kinetic energies. If P_1 and P_2 are their respective momenta, then $P_1 = P_2$ is

A. $m_1 : m_2$

B. $m_2 : m_1$

C. $m_1^2 : m_2^2$

D. $\sqrt{m_1} : \sqrt{m_2}$

14. In elastic collision,

A. only energy is conserved

B. only momentum is conserved

C. both energy and momentum is conserved

D. none of these

15. The velocity of a particle whose kinetic energy is equal to the rest energy is

A. $(1/2) c$

B. c

C. $\sqrt{3}/3 c$

D. $\sqrt{3} c$

16. The propeller of a ship makes 350 rev. while its speed increases from 200 rpm to 500 rpm. Then the time taken for this is

A. 1 min

B. 1.2 minute

C. 5.3 seconds

D. 53 seconds

17. The K.E. needed to project a body from the earth's surface to infinity is

A. mgR

B. $2 mgR$

C. $1/2 (mgR)$

D. $1/4 (mgR)$

18. The distance of two planets from the sun are 10^{13} and 10^{12} meters respectively. The ratio of time period of these two planets is

A. 10

B. $1/10$

C. 100

D. $100/10$

19. Poisson ratio is the ratio of

A. the linear strain to the lateral strain

B. the lateral strain to the linear strain

C. the linear stress to the lateral stress

D. the lateral stress to the linear stress

20. Two wires L and M are of the same material and of the same length, but the diameter of L is twice that of M stretching force applied to L is four times that of M. Then the ratio of the elongation of L to that of M is

A. $1 : 4$

B. $4 : 1$

C. $1 : 1$

D. 2 : 1

21. Which of the substance breaks just beyond the elastic limit?

A. Elastic

B. Malleable

C. Brittle

D. Ductile

22. A stone of mass 16 kg is attached to a string 144-meter-long and is whirled in a horizontal circle. The maximum tension the string can stand is 16 N. The maximum velocity of revolution that can be given to the stone without breaking it will be

A. 12 ms⁻¹

B. 14 ms⁻¹

C. 16 ms⁻¹

D. 20 ms⁻¹

23. A vessel containing 0.1 m³ of air at 76 cm of Hg pressure is connected to an evacuated vessel of capacity 0.09 m³. The resultant air pressure is

A. 20 cm of Hg

B. 30 cm of Hg

C. 40 cm of Hg

D. 50 cm of Hg

24. Two gases A and B having the same temperature T , same pressure P and the same volume V are mixed. If the mixture is at the same temperature T and occupies a volume V , the pressure of the mixture is

A. P

B. $2P$

C. $P/2$

D. $4P$

25. A solid ball of metal has spherical cavity inside it. If the ball is heated, the volume of the cavity will

A. increase

B. decrease

C. remain the same

D. disappear

26. If the law of heat conduction is written in the form of Ohm's law, then the quantity similar to electrical resistance is

A. A/dl

B. Ad/l

C. Al/d

D. d/Al

27. The work done from 250 cal of heat is

A. 1045 ergs

B. 1045 joules

C. 1045 watt

D. 1045 N

28. The time taken by a particle executing S.H.M of period T to move the mean position to half the maximum displacement is

A. $T/2$

- B. $T/4$
- C. $T/8$
- D. $T/12$

29. Let g be the acceleration due to gravity at earth's surface and K be the rotational K.E. of the earth. Suppose the earth's radius decreases by 2%, then

- A. g decreases by 2% and K decreases by 4%
- B. g decreases by 4% and K increases by 2%
- C. g increases by 4% and K decreases by 4%
- D. g decreases by 4% and K increases by 4%

30. A particle of mass m is hanging vertically by an ideal spring of force constant K . If the mass is made to oscillate vertically, its total energy is

- A. maximum at the extreme position
- B. maximum at the equilibrium
- C. minimum at the equilibrium
- D. same at all position

31. Velocity of sound in CO_2 is less than in hydrogen because

- A. CO_2 is heavier than hydrogen
- B. CO_2 is a compound and hydrogen is an element
- C. CO_2 is more soluble in water
- D. CO_2 can be more easily liquefied

32. The velocity of sound in air at room temperature is 110 m/sec. The length of the wave coming from a vibrating fork at frequency 275 is

- A. 0.4 m

- B. 100 m
- C. 825 m
- D. 1375 m

33. The temperature at which velocity of sound in air is double its velocity at 0°C is

- A. 435°C
- B. 694°C
- C. 781°C
- D. 819°C

34. Static electricity is produced by

- A. induction
- B. friction
- C. both induction and friction
- D. none of the above

35. Surface charge density on a pear shaped conductor is

- A. maximum in the middle position
- B. maximum near the tapering end
- C. maximum near the broad end
- D. equal throughout the surface

36. A given charge situated at a certain distance from an electric dipole in the end on position experiences a force F . If the distance of the charge is doubled, the force acting on the charge will be

- A. $2F$
- B. $F/2$
- C. $F/4$

D. $F/8$

37. A piece of fuse wire melts when the current is 5 A. The energy produced then is 1 J/s. The resistance of the fuse in ohm is

A. 0.04

B. 0.1

C. 0.5

D. 10

38. The gravitational force between two point masses m_1 and m_2 at separation r is given by

$F = (m_1 m_2)/r^2$ Then constant K

A. depends on systems of units only

B. depends on medium between masses only

C. depends of both masses and units

D. none of these

39. A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

A. each of them increases

B. each of them decreases

C. copper increases and germanium decreases

D. germanium increases and copper decreases

40. In a given thermocouple, the temperature of the cold junction is 20°C , while the neutral temperature is 27°C . What will be the temperature of immersion ?

A. 420°C

B. 425°C

C. 520°C

D. 525°C

41. When different parts of a metal are kept at different temperatures and current is passed through it, heat is either evolved or absorbed. The effect is called

- A. Peltier effect
- B. Seebeck effect
- C. Thomson effect
- D. Joule effect

42. A storage battery is to be charged from a d.c. supply. Which terminal of the battery should be connected to the positive side of the line?

- A. positive
- B. negative
- C. both positive and negative
- D. first negative and after the lapse of 5 minutes positive

43. The force between two parallel wires carrying currents in the same direction is a

- A. force of attraction
- B. force of repulsion
- C. no resultant force between the wires
- D. resultant force acting perpendicular to the flow of wires

44. The motion of an electric charge produces

- A. only an electric field
- B. only a magnetic field
- C. both magnetic and electric field

D. none of the above

45. An ammeter is connected in series with a 2V circuit containing a 2V battery when the switch is closed, the ammeter shows high deflection and comes to zero. The circuit may contain a

A. resistance of 20W

B. fuse

C. diode

D. triode

46. Ferromagnetic substances have

A. very high permeability and susceptibility

B. low permeability but high susceptibility

C. high permeability and low susceptibility

D. none of these

47. The permeability of the paramagnetic substance is

A. very large

B. very small

C. negative

D. small but more than 1

48. When a material is subjected to a small field H, the intensity of magnetisation is proportional to

A. $\frac{1}{H}$

B. H

C. H^2

D. $\frac{1}{H^2}$