Please be holistic regarding not to leave any mark or spot on the question paper.

1. $\vec{A} = 2\hat{\imath} + x\hat{\jmath} - 4\hat{k}$ and $\vec{B} = y\hat{\imath} + 6\hat{\jmath} - 8\hat{k}$
   What will be the values of x and y if $\vec{A}$ and $\vec{B}$ are parallel to each other?
   a. x = 3, y = 4   b. x = 4, y = 3
   b. x = 6, y = 2   d. x =12, y =1

2. If the ratio of three frequencies of sound is 4:5: 6, what is called the musical sound produced by that combination?
   a. Harmonics   b. Triad
   c. Harmony   d. Chord

3. Which is the correct graph of longitudinal **expansion versus weight** in the elastic limit?
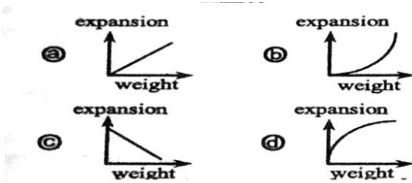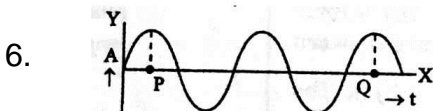

4. If the effective length of a second pendulum becomes 1.96 times, what will be its time period?
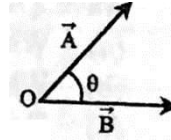   a. 3.92s   b. 2.8s   c. 3.44s   d. 1.4s

5.
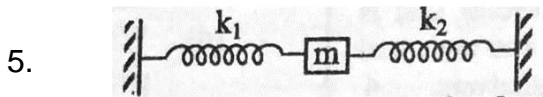
   If mass m of the body in the figure is released after pulling, then frequency of oscillation will be-

   ⓐ $f = \frac{1}{2\pi}\sqrt{\frac{k_1 - k_2}{m}}$

   ⓑ $f = \frac{1}{2\pi}\sqrt{\frac{m}{k_1 + k_2}}$

   ⓒ $f = \frac{1}{2\pi}\sqrt{\frac{m}{k_1 + k_2}}$

   ⓓ $f = \frac{1}{2\pi}\sqrt{\frac{k_1 + k_2}{m}}$

6.

   What is the phase difference between the points P and Q of the wave shown?
   a. $\frac{\pi}{2}$ b. π c. 2π d. 4π

7.

   In case of vectors $\vec{A}$ and $\vec{B}$ in figure—
   i. dot product obeys commutative law
   ii. cross product obeys commutative law
   iii. cross product does not obey commutative law
   Which one is correct?
   a. i and ii   b. i and iii   c. ii and iii   d. i, ii and iii

8. Unit of Torque is___
   i. N-m   ii. kgm^{2}s^{-2} iii. Js^{-1}
   Which one is correct?
   a. i b. i and ii c. i and iii d. ii and iii

9. Which is correct according to the kinetic theory or gases?
   a. Collisions between molecules are inelastic
   b. Molecules have no potential energy
   c. Molecules have no kinetic energy
   d. Molecules have no momentum

10. Which is the relation between rot mean square velocity C and Pressure P___.
    a. $C = \sqrt{\frac{3P}{P}}$ b. $C = \sqrt{\frac{3p}{P}}$
    b. $C = \sqrt{\frac{P}{3P}}$ d. $C = \sqrt{\frac{p}{3P}}$

11. The frequencies of two tuning forks are 260 Hz and 255 Hz respectively. How long after they will produce beats.
    a. 0.1 sec   b. 0.2 sec
    c. 0.5 sec   d. 0.8 sec

12. Which is the dimension of angular frequency?
a. $[M^0LT]$ b. $M^0L^0T^{-1}]$
c. $M^0L^{-1}T]$ d. $M^0LT^{-1}]$

13. If mass and radius of the earth are M and R then what will be the ratio $\frac{g}{G}$ on the surface of the earth?
a. MR^2 b. $\frac{R}{M}$ c. $\frac{M}{R^2}$ d. $\frac{M^2}{R}$

14. For which characteristics a drop of water is spherical?
a. Surface tension   b. Viscosity
c. Capillarity   d. Elasticity

15.   It can be said about the cross product of tow vectors that-
i. Cross product is a vector quantity
ii. The director of the cross product is perpendicular to that place of the vectors
iii. Cross product does not obey the law of exchange rule.
Which one is correct?
a. i and ii   b. ii and iii   c. i and iii   d. i and iii

16. It can be said to the mutual attractive forces between the different particles of substance that__
a. surface tension   b. additive force
c. cohesive force   d. viscous force

17. The characteristics of a simple harmonic oscillations are-
i. motion is periodic
ii. Acceleration is inversely proportional to displacement.
iii. linear motion
Which one is correct?
a. i and ii   b. i and iii   c. ii and iii   d. i and iii

18. Vibration is created to a body, this vibration in air-
i. propagates by adiabatic process

ii. propagates by the extension and contraction of air medium
iii. creates simple harmonic motion
Which one is correct?
a. i and ii   b. ii and iii   c. i and iii   **d. i and iii**

19. The true value of R at normal temperature an pressure is ---.
a. $8.31 \ Jk^{-1} \ mol^{-1}$ b. $8.30 \ J^{-1}k^{-1} \ mol^{-1}$
c. $8.31 \ Jk^{-1} \ mol$ d. $8.13 \ J \ mol^{-1}J^{-1}$

20. Difference in the reading of two thermometers in humidity measuring instrument_
i. if decreases suddenly there is a probability of storm
ii. if decreases slowly then there is probability of rain
iii. if becomes very small then it is the probability of dry weather.
Which one is correct?
a. i and ii   b. i and iii   c. ii and iii   d. i, ii and iii

21. How many times more is the Bolzman constant in C.G.S unit than SI unit?
a. 10^{-7} b. 10^7 c. 10^{-5} d. 10^5

22. If two similar vectors $\vec{A}$ and $\vec{B}$ act the same time and at same point then-
i. $\vec{A} . \vec{B} = 0$
ii. $\vec{A} \times \vec{B} = 0$
iii. $|\vec{A}| . |\vec{B}| = A + B$
Which one is correct?
a. i   b. i and ii   c. ii and iii   d. i and iii

23. If a elastic collision will occur between two bodies then-
i. the total momentum will remain the same before and after collision
ii. the total kinetic energy will remain the same before and after collision
iii. the two velocities will be exchange after collision.
Which one is correct?

a. i and ii   b. ii and iii   c. i and iii   d. i and iii

24. Which graph is applicable for Boyle's law?
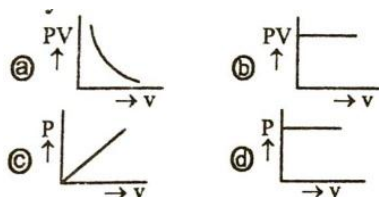
25. If the frequency of the overtone is twice the frequency of the fundamental tone then it is called-
a. Melody   b. Musical interval
c. Musical scale   d. Octave

Read the stem and answer the question no.26:
In a children park a child is swinging in a cradle suddenly it saw its mother and stood up.

26. What change will occur to the cradle pendulum?
a. Will go slow
b. Will go fast
c. Will stop
d. Will go fast at first and then slow

27. The liquids which do not wet the glass, their angle of contact will be-
a. 0^0 b. 90^0 c. less than 90^0 d. greater than 90^0

28. Which one is correct if the distance between the source and the observer is twice?
a. Two times increase   b. Four times increase
c. Two times decrease   d. Four times decrees

29. The stretched wire of length Lm and mass M kg then frequency f is ___
a. $f \propto \sqrt{\frac{L}{M}}$ b. $f \propto \sqrt{ML}$

c. $f \propto \sqrt{\frac{M}{L}}$ d. $f \propto \sqrt{\frac{1}{ML}}$

30. A wire is divided into two equal parts. The breaking weights of the wire will be___.
a. half   b. equal   c. twice   d. one-forth

31. A spherical ball of radius R falling with terminal velocity v through a medium f co-efficient of viscosity η_1 acting viscous force F will be ___
a. $F \alpha R$ and $F \alpha \frac{1}{v}$ b. $F \alpha R$ and $F \alpha v$
c. $F \alpha \frac{1}{R}$ and $F \alpha \frac{1}{v}$ d. $f \propto \frac{1}{R}$ and $F \alpha v$

32. A wire of lengths 1m and diameter 1mm. Length is increased 0.025 cm by a force. What is he decreased diameter?
a. 1.5×10^6 mm   b. 2.5×10^{-5} mm
c. 3.5×10^5 mm   d. 2.5mm

33. Pressure of a gas (P) and volume (V) according to Boyles' Law which one is correct?
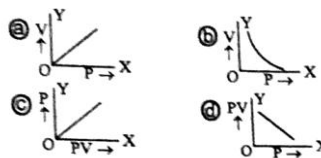
34. If the vector field $\vec{v}$ irrigational then which one is correct?
a. $\vec{\nabla}.\vec{v} = 0$ b. $\vec{\nabla} \times \vec{v} = 0$
c. $\nabla.\vec{v} \neq 0$ d. $\nabla \times \vec{v} \neq 0$

35. If a truck of velocity V_T towards east and a car of velocity V_C towards west. Which is the relative velocity of car with respect too truck?
a. $(V_T + V_C)$ b. $(V_T - V_C)$
c. $(V_c - V_r)$ d. $\frac{V_T}{V_c}$

36. Characteristics of uniform circular motion-
i. Have uniform angular velocity
ii. Angular acceleration is zero
iii. Have no centripetal acceleration
    Which one is correct?

a. i and ii   b. ii and iii   c. i and iii   d. i, ii and iii

37. A particle moves in a simple harmonic motion, amplitude A and displacement x. Acceleration is minimum when--.
   a. x=A position   b. x= $\frac{A}{2}$ positon
   c. x = $\frac{A}{4}$ position   d. x = o position

38. A square frame of L arm immersed into a liquid and then lifts up. What is the work done when the displacement of one are is x?
   a. W=2LT   b. W =T
   c. W= 2LTx   d. W=LTx

39. Which is the relation between root mean square velocity and absolute temperature?
   a. $C_{rms} \propto T$ b. $C_{rms} \propto \sqrt{T}$
   d. $C_{rms} \propto \frac{I}{T}$ d. $C_{rms} \propto \frac{1}{\sqrt{T}}$

40. Which one is he dimension of force constant?
   a. $[ML^0T^{-2}]$ b. $[ML^2T^{-1}]$
   c. $[ML^{-2}]$ d. $[ML^2T^2]$

41. A body of mass 5kg is moved from a point of position $\vec{r_1} = (8\hat{\imath} = 7\hat{\jmath} - 3\hat{k})m$ to another poit of position $\vec{r_1} = (12\hat{\imath} + 2\hat{\jmath} - 2\hat{k})m$ under a force $\hat{F} = (10\hat{\imath} + 3\hat{\jmath} - 2\hat{k})$N. The amount of work done is _-
   a. 2J   b. 3J   c. 5J   d. 7J

42. If $\hat{n} = \frac{\vec{A}X\vec{B}}{|\vec{A}\times\vec{B}|}$ then - $\hat{n}$ equal to what?
   a. $\frac{\vec{B}\times\vec{A}}{|\vec{A}\times\vec{B}|}$ b. $\frac{\vec{A}\times\vec{B}}{|\vec{B}\times\vec{A}|}$
   c. $\frac{|\vec{B}+\vec{A}|}{\vec{A}\times\vec{B}}$ d. $\frac{|\vec{A}+B|}{\vec{B}\times\vec{A}}$

Read the following stem and answer the question nos. 43 & 44.
Path difference between two particles of a wave is 22.5 cm and phase difference is 3.14 rad. Frequency of the source is 420 Hz.

43. Wave length of the wave is what?
   a. 0.25m   d. 0.45   c. 0.75   d. 45m

44. According to the stem-
   i. Wave velocity is 189 ms^{-1}
   ii. Create audible sound
   iii. Time period will be 2.38 sec.
   Which one is correct?
   a. i and ii   b. ii and iii
   c. i and iii   d. i, ii and iii

45. If gravitational acceleration g and time period T, which one of the following graph is correct?