



An Eye on Talent

## Olympiad Aptitude Test Physics- Grade XI

- The horizontal component of a force of 10 N inclined at  $30^\circ$  to the vertical is...
  - 5 N
  - $5\sqrt{3}$  N
  - 3 N
  - $10/\sqrt{3}$  N
- When the velocity of a moving object is doubled...
  - its acceleration is doubled
  - its momentum is doubled
  - its kinetic energy is doubled
  - its potential energy is doubled
- At which of the following temperatures would the molecules of a gas have twice the average kinetic energy they have at  $20^\circ\text{C}$ ?
  - $40^\circ\text{C}$
  - $80^\circ\text{C}$
  - $313^\circ\text{C}$
  - $586^\circ\text{C}$
- A light ray passes through a prism with an angle of incidence  $\theta$ , an angle of deviation  $\delta$  and an angle of emergence  $\epsilon$ . Minimum deviation occurs when...
  - $\delta = \theta$
  - $\delta = \epsilon$
  - $\theta = \epsilon$
  - $\delta = \theta - \epsilon$
- Two satellites have periods  $P_1$  and  $P_2$ , respectively. Their heights above the surface of the earth are  $h_1$  and  $h_2$ , respectively. If  $h_1 > h_2$ , then...
  - $P_1 > P_2$
  - $P_1 = P_2$
  - $P_1 < P_2$
  - $P_1 > P_2$
- Two parallel wires carry current in the same direction,...
  - they attract each other
  - they repel each other
  - they neither attract nor repel
  - they attract or repel depending on current type
- The only atom which has no neutron in the nucleus is...
  - hydrogen
  - helium
  - oxygen
  - polonium



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8. A charge  $q$  is placed at the centre of the line joining two equal charges  $Q$ . The system of the three charges will be in equilibrium if  $q$  is equal to...

- A.  $-(Q/2)$
- B.  $-(Q/4)$
- C.  $+(Q/4)$
- D.  $+(Q/2)$

9. The unit of the force constant is...

- A. Nm
- B. Nm<sup>2</sup>
- C. Nm<sup>-2</sup>
- D. Nm<sup>-1</sup>

10. The total electric flux is...

- A. always positive
- B. always negative
- C. always zero
- D. none of the above

11. Three particles of masses 1 kg, 2 kg and 1 kg are at the points whose position vectors are  $i + j$ ,  $2i - j$  and  $3i + j$ , respectively. The position vector of their centre of mass is...

- A.  $(6i + j)/4$
- B.  $2i$
- C.  $(6i + j)/3$
- D.  $8i$

12. Ozone layer absorbs all electromagnetic radiations having wavelength...

- A. smaller than  $3 \times 10^{-7}$  m
- B. smaller than  $3 \times 10^{-8}$  m
- C. greater than  $3 \times 10^{-7}$  m
- D. greater than  $3 \times 10^{-8}$  m

13. After 10 years 75 g of an original sample of 100 g of a certain radioactive element has decayed. The half-life of the isotope is...

- A. 5 years
- B. 7.5 years
- C. 20 years
- D. 40 years



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14. It is impossible to polarize...
- A. white light
  - B. radio waves
  - C. X-rays
  - D. sound waves
15. Two  $50 \mu\text{F}$  capacitors are connected in parallel. The equivalent capacitance of the combination is...
- A.  $25 \mu\text{F}$
  - B.  $50 \mu\text{F}$
  - C.  $100 \mu\text{F}$
  - D.  $200 \mu\text{F}$
16. Ferromagnetism is observed...
- A. only in crystalline state
  - B. only in amorphous solid state
  - C. both in crystalline and amorphous state
  - D. in any state of the substance
17. The velocities of violet and red lights are  $V_v$  and  $V_r$ , respectively, then...
- A.  $V_v = V_r$  in glass
  - B.  $V_v = V_r$  in vacuum
  - C.  $V_v > V_r$  in glass
  - D.  $V_v > V_r$  in vacuum
18. 1 astronomical unit is equal to...
- A. 499 light seconds
  - B. 149597 km
  - C.  $3 \times 10^{10}$  km
  - D.  $3 \times 10^{10}$  m
19. A boat which has a speed of 5 km/h in still water crosses a river of width 1 km along the shortest possible path in 15 minutes. The velocity of the river water in km/h is...
- A. 1    B. 3
  - C. 4    D.  $\sqrt{41}$
20. If one mole of monoatomic gas ( $\gamma = 5/3$ ) is mixed with one mole of a diatomic gas ( $\gamma = 7/5$ ), the value of  $\gamma$  for the mixture is...
- A. 1.40            B. 1.50
  - C. 1.53            D. 3.07