

DEPARTMENT OF EDUCATION  
CENTRAL TIBETAN ADMINISTRATION, DHARAMSHALA  
ENTRANCE EXAMINATION-2011.

PHYSICS

Time : 1 hours

Max. Marks 50.

INSTRUCTIONS:

There are fifty questions in this paper. All the questions are of Multiple Choice type and carry equal marks. Each question is followed by four responses marked (a), (b), (c) and (d). Select the one, which is the best in each case and record it clearly against the question number on the answer sheets provided with the paper.

More than one response indicated against an item or overwriting in the answer sheet would deem as incorrect response and no mark will be granted on that.

Question paper along with the answer sheet of the paper should be returned to the invigilator after the completion of the paper or when the time is over whichever is earlier.

Roll No. \_\_\_\_\_

Marks obtained by the candidate:

\_\_\_\_\_

Signature of Examiner

PHYSICS-2011

- Q.1. Which of the following pairs have the same dimensions?  
(a) Young's modulus and surface tension  
(b) Torque and energy  
(c) Second and light year  
(d) Momentum and work
- Q.2. A satellite is orbiting around the earth. The centripetal force on the satellite is  $F$ . The gravitational force of the earth on the satellite is also  $F$ . The net force on the satellite is:  
(a) Zero  
(b)  $0.5 F$   
(c)  $F$   
(d)  $2 F$
- Q.3. A constant force acts on a body. The body moves with uniform:  
(a) speed  
(b) velocity  
(c) acceleration  
(d) momentum
- Q.4. The gravitational potential difference between the surface of a planet and a point 20 m above it is  $16 \text{ J kg}^{-1}$ . The work done in moving a 2.0 kg mass by 8.0 m on a slope of  $60^\circ$  from the horizontal is equal to:  
(a) 32 J  
(b) 16 J  
(c) 9.6 J  
(d) none of the above
- Q.5. Which of the following particles when moving in the magnetic field is not at all deflected from their normal path?  
(a) Electron  
(b) Proton  
(c) Positron  
(d) Photon
- Q.6. IN the cyclotron the frequency of rotation of the charged particle is ordinarily independent of:  
(a) magnetic induction  
(b) charge on the particle  
(c) mass of the particle  
(d) speed of the particle

- Q.7. A player catches a cricket ball of mass 0.15 kg moving with a speed of  $20 \text{ ms}^{-1}$ . The process of catching is completed in 0.1 s. The average force exerted by the player is:
- (a) 30 N (b) 3 N  
(c) 0.3 N (d) 0.03 N?
- Q.8. A body of mass 10 kg is sliding down a rough inclined plane which makes an angle of  $30^\circ$  with the horizontal. Given that the co-efficient of friction is 0.25, what is the acceleration of the body?
- (a)  $1.39 \text{ ms}^{-2}$  (b)  $2.78 \text{ ms}^{-2}$   
(c)  $3.65 \text{ ms}^{-2}$  (d)  $5.56 \text{ ms}^{-2}$ ?
- Q.9. The velocity of a vibrating particle is given by:
- $$v = 10 \cos(60t + 30m) \text{ ms}^{-1}$$
- If  $t$  is in seconds, the displacement amplitude is:
- (a)  $10 \times 60 \text{ m}$  (b)  $(10 \times 60 / 2\pi) \text{ m}$   
(c)  $(10/60) \text{ m}$  (d)  $(2\pi \times 10 \times 60) \text{ m}$
- Q.10. When the light passes from glass to air, there is no change in it's:
- (a) intensity (b) velocity  
(c) frequency (d) wavelength
- Q.11. A ray of light having wave length  $720 \text{ nm}$  enters glass of refractive index 1.5. The wavelength of the ray within the glass will be:
- (a)  $360 \text{ nm}$  (b)  $480 \text{ nm}$   
(c)  $720 \text{ nm}$  (d)  $1080 \text{ nm}$
- Q.12. The sun revolves about the axis of the galaxy at a speed which is nearest to:
- (a)  $250 \text{ km s}^{-1}$  (b) 250 km per minute  
(c)  $250 \text{ km h}^{-1}$  (d) 250 km per day
- Q.13. The maximum possible efficiency of a heat engine working between  $400^\circ \text{C}$  and  $100^\circ \text{C}$  is nearest to:
- (a) 30% (b) 45%  
(c) 60% (d) 75%

- Q.14. Two coherent waves of intensities  $I$  and  $4I$  are superimposed on each other. The intensity at the constructive interference will be:
- (a)  $3I$  (b)  $5I$   
(c)  $9I$  (d)  $17I$
- Q.15. The electron is accelerated through a potential difference of 10 V. The additional energy acquired by the electron is:
- (a)  $1.6 \times 10^{-19} J$  (b)  $1.6 \times 10^{-18} J$   
(c)  $1.6 \times 10^{-19} eV$  (d)  $1.6 \times 10^{-18} eV$
- Q.16. Which of the following can be derived from the law of conservation of energy?
- (a) Coulomb's law (b) Gauss's law  
(c) Lenz's law (d) Ampere's law
- Q.17. If the separation between the slits in Young's double slit experiment is increased, the fringes:
- (a) become broader (b) remain unchanged  
(c) become narrower (d) become faint
- Q.18. The reactance of an inductance of 0.01 H to a 50 Hz ac is:
- (a)  $6.28 \Omega$  (b)  $3.14 \Omega$   
(c)  $1.0 \Omega$  (d)  $0.5 \Omega$
- Q.19. An ac of 50 Hz is passed through a circuit containing inductance  $L$ , resistance  $R$  and capacitance  $C$ . The current and voltage are in phase through:
- (a)  $R$  (b)  $C$   
(c)  $L$  (d) none of the above
- Q.20. A particle of mass  $m$  and its antiparticle are completely annihilated and converted into energy. The amount of energy produced is:
- (a)  $\frac{1}{2} mc^2$  (b)  $mc^2$   
(c)  $2mc^2$  (d)  $4mc^2$
- Q.21. Four wires of same material are stretched by the same load. Their dimensions are as follows. Which of them is elongated most?
- (a) length : 50 cm, diameter 0.5 mm (b) length : 100 cm, diameter 1 mm  
(c) length : 200 cm, diameter 2 mm (d) length : 300 cm, diameter 3 mm

- Q.22. What is the dielectric constant of a conductor?  
(a) Zero (b) Less than 1  
(c) 1 (d) Infinitely large
- Q.23. The temperature of a body is doubled. Its thermal conductivity:  
(a) is halved (b) is doubled  
(c) remains unchanged (d) may be increased or decreased
- Q.24. A high magnetic retentivity is essential for the construction of cores of  
(a) transformers (b) electromagnets  
(c) galvanometers (d) none of the above
- Q.25. The moment of inertia depends upon:  
(a) torque (b) angular speed  
(c) distribution of mass about the axis (d) nature of material of the body
- Q.26. The temperature of an ideal gas enclosed in a chamber is raised from 300 K to 600 K. The pressure becomes two fold because:  
(a) mean molecular velocity becomes  $\sqrt{2}$  fold  
(b) root mean square velocity becomes  $\sqrt{2}$  fold  
(c) number of molecules striking the wall per unit time becomes 2 fold  
(d) energy transferred to walls per unit time becomes 2 fold
- Q.27. 10 identical cells each of emf  $E$  and internal resistance  $r$ , are connected in series to form a closed circuit. An ideal voltmeter connected across 3 cells will read:  
(a) 3  $E$  (b) 7  $E$   
(c) 10  $E$  (d) 13  $E$
- Q.28. A soap film held vertically is viewed in reflected sunlight. The observer would see a number of:  
(a) vertical white and black fringes (b) horizontal coloured fringes  
(c) horizontal white and black fringes (d) vertical coloured fringes
- Q.29. A gas is taken through a number of thermodynamic states. What happens to its specific heat?  
(a) It is always constant  
(b) It decreases  
(c) It increases  
(d) It can have any value depending upon the process of heat absorbed or evolved



Q.35. The characteristic of the electrons striking the target which determines the intensity of X-rays is

- (a) mass (b) energy  
(c) number incident per second (d) momentum

Q.36. The magnifying power of an astronomical telescope can be increased by

- (a) increasing the focal length of objective  
(b) increasing the focal length of eye piece  
(c) increasing the focal length of objective and decreasing that of eye piece  
(d) decreasing the focal length of objective and increasing that of eye piece

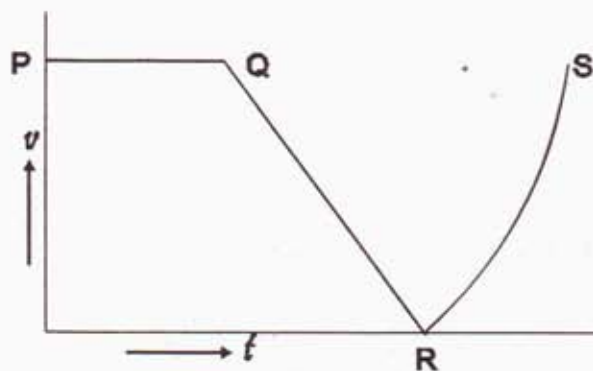
Q.37. While measuring acceleration due to gravity with simple pendulum, a student makes a positive error of 1% in the measurement of length and a negative error of 3% in the measurement of time period. Percentage positive error in the measurement of  $g$  will be:

- (a) 2% (b) 4%  
(c) 7% (d) 10%

Q.38. Two vectors  $\vec{A}$  and  $\vec{B}$  are parallel to each other when:

- (a)  $\vec{A} + \vec{B} = 0$  (b)  $\vec{A} - \vec{B} = 0$   
(c)  $\vec{A} \cdot \vec{B} = 0$  (d)  $\vec{A} \times \vec{B} = 0$

Q.39. Following figures shows a velocity time graph of a body. The force on the body is zero between:



- (a) P to Q (b) Q to R  
(c) R to S (d) none of the above

- Q.40. A motor cyclist moving with a velocity of 72 km/h on a flat road takes a turn on the road at a point where radius of curvature of road is 20 m. In order to avoid skidding, he must not bend with respect to the vertical plane by an angle  $\theta$  greater than
- (a)  $\tan^{-1}(6)$  (b)  $\tan^{-1}(2)$   
(c)  $\tan^{-1}(25.92)$  (d)  $\tan^{-1}(4)$
- Q.41. In the measurement of resistance by a meter bridge, the current is necessarily reversed through the bridge wire to eliminate.
- (a) end errors (b) errors due to thermoelectric effects  
(c) the index error (d) random errors
- Q.42. Two cells, each of emf  $E$  and internal resistance  $r$ , are connected in parallel across a resistor  $R$ . The power delivered to the resistor is a maximum if
- (a)  $R = r/2$  (b)  $R = 2r$   
(c)  $R = r$  (d)  $R = 0$
- Q.43. What should be the length of a closed organ pipe to produce resonance with an open organ pipe of length 40 cm?
- (a) 40 cm (b) 20 cm  
(c) 10 cm (d) none of the above
- Q.44. How many molecules are there in the unit cell of simple cubic crystal lattice?
- (a) 1 (b) 2  
(c) 4 (d) 8
- Q.45. The kinetic energy of a particle becomes 4 times. How many times will its de-Broglie wave length be?
- (a)  $\frac{1}{4}$  (b)  $\frac{1}{2}$   
(c) 2 (d) 4
- Q.46. Why fusion requires high temperature? At high temperature:
- (a) atoms are ionised  
(b) molecules break into atoms  
(c) nuclei break into constituents  
(d) kinetic energy is high enough to overcome inter atomic repulsive forces

- Q.47. 10% of a radioactive substance decays in 5 days. The percentage of the substance left undecayed after 20 days will be nearest to:
- (a) 80% (b) 65%  
(c) 50% (d) none of the above
- Q.48. In Bohr's atomic model, the stationary orbits are postulated to meet the requirement:
- (a) of classical physics  
(b) dynamic equilibrium of electron  
(c) that the electrons do not radiate in stationary orbits  
(d) of ionizing the atom
- Q.49. In the Boolean algebra which of the following is not equal to A?
- (a)  $A.A$  (b)  $A + A$   
(c)  $\bar{A} . A$  (d)  $\bar{A} + \bar{A}$
- Q.50. Which of the following has the least value in the common base amplifier?
- (a) Power gain (b) Voltage gain  
(c) Current gain (d) Resistance gain



**DEPARTMENT OF EDUCATION**  
**CENTRAL TIBETAN ADMINISTRATION, DHARAMSHALA**  
**ENTRANCE EXAMINATION-2011.**

<b>ANSWER SHEET FOR PHYSICS</b>	<b>Roll No.</b>	
-------------------------------------	-----------------	--

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1		2		3		4		5	
6		7		8		9		10	
11		12		13		14		15	
16		17		18		19		20	
21		22		23		24		25	
26		27		28		29		30	
31		32		33		34		35	
36		37		38		39		40	
41		42		43		44		45	
46		47		48		49		50	