

# WISDOM SCHOLASTIC APTITUDE TEST (WSAT)

for

IIT-JEE ASPIRANTS

Sample Question Paper

## PHYSICS

- A ray of light traveling in air is incident on the plane surface a transparent medium. The angle of incidence is  $45^\circ$  and the angle of refraction is  $30^\circ$ . Find the refractive index of the medium  
(a)  $1/2$  (b)  $1/\sqrt{2}$  (c)  $\sqrt{2}$  (d) None of these
- When white light passes through a prism, it splits into its component colours. This phenomenon is called :  
(a) spectrum (b) reflection (c) refraction (d) dispersion
- $f = \frac{r}{2}$  may be valid  
(a) For convex mirrors but not for concave mirrors  
(b) For concave mirrors but not for convex mirrors  
(c) For both convex and concave mirrors  
(d) Neither for convex mirrors nor for concave mirrors
- A point object is placed at a distance of 12 cm from a convex lens on its principal axis. Its image is formed on the other side of the lens at a distance of 18 cm from the lens. Find the focal length of the lens.  
(a) 5.4 cm (b) 7.2 cm (c) 6.8 cm (d) 10 cm
- The linear magnification for convex mirror  
(a) is always positive (b) is always negative  
(c) is always zero (d) may be positive or negative
- The linear magnification of a convex lens  
(a) is always negative (b) may be positive or negative  
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- The color at sky appears blue due to  
(a) Dispersion of light (b) Scattering of light  
(c) Atmospheric Refraction (d) Reflection of light
- In dispersion of light, which color travels fastest in prism?  
(a) Yellow (b) Violet (c) Red (d) Orange
- The incident light and emergent light in a glass slab are:  
(a) Perpendicular to each other (b) Parallel to each other  
(c) First parallel then perpendicular (d) None of these
- The focal length of a convex lens is 20 cm. The power of lens is:  
(a) 0.05 D (b)  $-0.05$  D (c) 5 D (d)  $-5$  D

## (CHEMISTRY)

11. When the gases sulphur dioxide and hydrogen sulphide mix in the reaction  $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + 3\text{S}$  occurs. Here hydrogen sulphide is acting as
- (a) an oxidizing agent (b) a reducing agent  
(c) a dehydrating agent (d) a catalyst
12. The equation:  $\text{Na}_2\text{CO}_3 + x\text{HCl} \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$  the value of x is
- (a) 1 (b) 2 (c) 3 (d) 4
13. Which of the following is acidic in nature?
- (a) Lime juice (b) Human blood (c) Lime water (d) Antacid
14. Which of the following can undergo a chemical reaction?
- (a)  $\text{MgSO}_4 + \text{Fe}$  (b)  $\text{MgSO}_4 + \text{Pb}$  (c)  $\text{ZnSO}_4 + \text{Fe}$  (d)  $\text{CuSO}_4 + \text{Fe}$
15. When sulphur is heated strongly burns with choking smell because produced gas is
- (a)  $\text{H}_2\text{S}$  (b)  $\text{SO}_2$  (c)  $\text{SO}_3$  (d)  $\text{HS}_2\text{O}_7$
16. A solution is having pH 5. It will turn blue litmus to
- (a) Red (b) Does not effect (c) Green (d) Both (a) and (c)
17. Which of the following statements about the given reaction are correct?  
 $3\text{Fe} (\text{s}) + 4\text{H}_2\text{O} (\text{g}) \rightarrow \text{Fe}_3\text{O}_4 (\text{s}) + 4 \text{H}_2 (\text{g})$
- (i) Iron metal is getting oxidised (ii) Water is getting reduced  
(iii) Water is acting as reducing agent (iv) Water is acting as oxidising agent
- (a) (i), (ii) and (iii) (b) (ii) and (iv) (c) (i), (ii) and (iv) (d) (ii) and (iv)
18. Three beakers labelled as A, B and C each containing 25 ml of water were taken. A small amount of NaOH, anhydrous  $\text{CuSO}_4$  and  $\text{NaCl}$  were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solution contained in beakers A and B, whereas in case of beaker C, the temperature of the solution falls. Which one of the following statement(s) is (are) correct?
- (i) In beakers A and B, exothermic process has occurred.  
(ii) In beakers A and B, endothermic process has occurred.  
(iii) In beaker C exothermic process has occurred.  
(iv) In beaker C endothermic process has occurred.
- (a) (i) only (b) (ii) only (c) (i) and (iv) (d) (iv), (ii) and (iii)
19. A substance 'X' is used in white-washing and is obtained by heating limestone in the absence of air. Identify 'X'.
- (a)  $\text{CaOCl}_2$  (b)  $\text{Ca} (\text{OH})_2$  (c)  $\text{CaO}$  (d)  $\text{CaCO}_3$
20. In Goldschmidt aluminothermic process, reducing agent is:
- (a) coke (b) sodium (c) aluminium powder (d) alumina

(MATHEMATICS)

21. If one root of the polynomial  $f(x) = 5x^2 + 13x + k$  is reciprocal of the other, then the value of  $k$  is :  
(a) 0 (b) 5 (c)  $\frac{1}{6}$  (d) 6
22. If  $\alpha, \beta$  are the roots of the equation  $ax^2 - bx + b = 0$ , ( $a, b > 0$ ) then the value of  $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} - \sqrt{\frac{b}{a}}$  is always equals to :  
(a) 2 (b) -1 (c) 0 (d) 1
23. ABC is a right angled triangle, right angled at B such that  $BC = 6$  cm and  $AB = 8$  cm. A circle with centre O is inscribed in  $\Delta ABC$ . The radius of the circle is:  
(a) 1 cm (b) 2 cm (c) 3 cm (d) 4 cm
24. The value of  $k$  for which the system of equations:  $kx - y = 2$ ,  $6x - 2y = 3$ , has a unique solution, is  
(a) = 3 (b)  $\neq 3$  (c)  $\neq 0$  (d) = 0
25. If  $\tan \theta = \frac{a}{b}$ , then  $\frac{a \sin \theta + b \cos \theta}{a \sin \theta - b \cos \theta}$  is equal to  
(a)  $\frac{a^2 + b^2}{a^2 - b^2}$  (b)  $\frac{a^2 - b^2}{a^2 + b^2}$  (c)  $\frac{a + b}{a - b}$  (d)  $\frac{a - b}{a + b}$
26. The value of  $(1 + \cot \theta - \operatorname{cosec} \theta)(1 + \tan \theta + \sec \theta)$  is  
(a) 1 (b) 2 (c) 4 (d) 0
27. If the centroid of the triangle formed by the points  $(a, b)$ ,  $(b, c)$  and  $(c, a)$  is at the origin, then  $a^3 + b^3 + c^3 =$   
(a)  $abc$  (b) 0 (c)  $a + b + c$  (d)  $3abc$
28. If  $x^n - y^n$  is divisible by  $x - y$  then  $x$  must be  
(a) Natural Number (b) Integer (c) Whole Number (d) None of these
29. The fourth vertex of the rhombus formed by  $(-1, -1)$ ,  $(6, 1)$  and  $(8, 8)$  is  
(a)  $(3, 4)$  (b)  $(2, 3)$  (c)  $(2, 5)$  (d)  $(1, 6)$
30. The ratio in which  $2x + 3y = 0$  divides the join of A  $(3, 4)$  and B  $(7, 8)$  is  
(a)  $3 : 2$  (b)  $3 : 5$  (c)  $2 : 3$  (d)  $5 : 3$
31. The area of triangle is 5 and two of its vertices are  $(2, 1)$  and  $(3, -2)$ . If the third vertex lie on  $y = x + 3$ , then its coordinates will be  
(a)  $\left(\frac{7}{2}, \frac{13}{2}\right)$  (b)  $\left(\frac{-7}{2}, \frac{-1}{2}\right)$  (c)  $\left(\frac{5}{2}, \frac{11}{2}\right)$  (d)  $\left(\frac{-5}{2}, \frac{1}{2}\right)$
32. The mid-point of the line joining the points  $(-10, 8)$  and  $(-6, 12)$  divides the line joining the points  $(4, -2)$  in the ratio  
(a)  $1 : 2$  internally (b)  $2 : 1$  internally (c)  $1 : 2$  externally (d)  $2 : 1$  externally

33. The number of points equidistant to three given non-collinear points is  
 (a) 0 (b) 2 (c) 1 (d) Infinite
34. If  $A + B = 90^\circ$ , then  $\sqrt{\sin A \sec B - \sin A \cos B} = ?$   
 (a)  $\sin A$  (b)  $\operatorname{cosec} A$  (c)  $\cos A$  (d)  $\sec A$
35. If  $3 \sin \theta + 4 \cos \theta = 5$ , then  $3 \cos \theta - 4 \sin \theta = ?$   
 (a) 0 (b)  $-5$  (c) 5 (d)  $\pm 5$
36. If  $\sec \theta + \tan \theta = p$ , then  $\sin \theta = ?$   
 (a)  $\frac{p^2 + 1}{p^2 - 1}$  (b)  $\frac{2p}{p^2 - 1}$  (c)  $\frac{2p}{p^2 + 1}$  (d)  $\frac{p^2 - 1}{p^2 + 1}$
37. If a polynomial  $p(x)$  is divided by another polynomial  $g(x)$ , with quotient  $q(x)$  and remainder  $r(x)$ , then  $p(x) = q(x).g(x) + r(x)$ . What is the condition that  $r(x)$  must satisfy?  
 (a)  $r(x) = 0$  (b) Either  $r(x) = 0$  or  $\deg r(x) < \deg g(x)$   
 (c)  $r(x) = 0$  or  $\deg r(x) > \deg g(x)$  (d)  $r(x) = g(x)$
38.  $\triangle ABC$  is an equilateral triangle in which  $AD \perp BC$ , then  $AD^2 =$   
 (a)  $3CA^2$  (b)  $3CD^2$  (c)  $4BD^2$  (d)  $CA^2$
39. In rolling two die, the probability of getting sum of atleast 6 \_\_\_\_\_.  
 (a)  $\frac{11}{36}$  (b)  $\frac{15}{36}$  (c)  $\frac{26}{36}$  (d)  $\frac{29}{36}$
40. If  $f(x) = \frac{1}{(\sqrt{x+2\sqrt{2x-4}})} + \frac{1}{\sqrt{(x-2\sqrt{2x-4})}}$  for  $x > 2$  then  $f(11)$  equals  
 (a)  $\frac{7}{6}$  (b)  $\frac{6}{7}$  (c)  $\frac{5}{6}$  (d)  $\frac{5}{7}$

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NEET ASPIRANTS

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(a) (i) only      (b) (ii) only      (c) (i) and (iv)      (d) (iv), (ii) and (iii)
19. A substance 'X' is used in white-washing and is obtained by heating limestone in the absence of air. Identify 'X'.  
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## BIOLOGY

21. The common translocated form in plants of carbohydrate is  
(a) Glucose (b) Sucrose (c) Starch (d) Glycogen
22. Oxygen released during photosynthesis comes from:  
(a) Water (b) Carbon dioxide (c) Chloroplast (d) Chlorophyll
23. Transpiration is a useful process as it involved in  
(a) Loss of water  
(b) Food translocation  
(c) Ascent of water and minerals and reduce the impact of temperature on plants.  
(d) Growth and curvature of plants.
24. Statements A, B, C and D.  
I. The digestion of starch (carbohydrate) begins in the buccal cavity by ptyalin enzyme.  
II. Protein digestion begins in the stomach.  
III. Gastric lipase enzyme completely breaks down the lipids.  
IV. Hydrochloric acid, proteins digesting enzymes and mucus are present in the gastric juice.  
*The correct and wrong statements are given in*  
(a) I, III and IV are correct; while B is wrong (b) I, II and IV are correct; while III is wrong  
(c) II, III and IV are correct; while A is wrong (d) I, II and III are correct; while IV is wrong
25. Chemical released by blood platelets is  
(a) Thromboplastin (b) Heparin (c) Fibrinogen (d) Prothrombin
26. The instrument measuring blood pressure is  
(a) Stethoscope (b) Electrocardiograph  
(c) Electroencephalograph (d) Sphygmomanometer
27. Functions as a middle man between blood and tissue fluid.  
(a) Plasma (b) Lymph (c) Serum (d) Albumin
28. The area of maximum reabsorption in a renal tubule occurs at  
(a) DCT (b) PCT (c) Henle's loop (d) Glomerulus
29. The opening of aorta is guarded by:  
(a) Tricuspid valve (b) Mitral valve (c) Semilunar valve (d) Bicuspid valve
30. The proteins digesting enzyme in stomach which degrades milk proteins:  
(a) Pepsin (b) Trypsin (c) Ptyalin (d) Rennin
31. Life span of RBC is  
(a) 120 days (b) 80 days (c) 40 days (d) 1 week

32. If a seriously injured person is hospitalized in a critical condition, which blood group can be given immediately without testing the blood of the injured person?  
 (a) AB blood group (b) B blood group (c) O blood group (d) A blood group
33. The left auricle opens into left ventricle through an aperture guarded by  
 (a) Tricuspid valve (b) Bicuspid valve (c) Mitral valves (d) Both (b) & (c)
34. Which of the following statement(s) wrong with regard to heart?  
 I. Left atrium receives oxygenated blood from different parts of the body while right atrium receives deoxygenated blood from the lungs.  
 II. Left ventricle pumps oxygenated blood to different body parts while right ventricle pumps deoxygenated blood to the lungs.  
 III. Right atrium receives deoxygenated blood from different body parts while left ventricle pumps oxygenated blood to different parts of the body.  
 IV. Pulmonary vein carries deoxygenated blood to the lungs and pulmonary artery brings oxygenated blood towards the heart.  
 (a) I and III (b) III only (c) Both I and IV (d) IV only
35. The pacemaker of the heart is  
 (a) AV node (b) SA node (c) Bundle of His (d) Purkinje fibres

### MATHEMATICS

36. If one root of the polynomial  $f(x) = 5x^2 + 13x + k$  is reciprocal of the other, then the value of k is :  
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