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ADMISSION TEST (JEE)

SAMPLE PAPER Set-1

COURSE: One Year (XI going to XII)



ADMISSION TEST PATTERN

PHYSICS : 25 MCQs

CHEMISTRY : 25 MCQs

MATHEMATICS : 25 MCQs

Total Questions: 75

Test Duration: 120 minutes (2 Hours)

SECTION A : PHYSICS

1. The wavelength λ associated with a moving particle is given by $\lambda = m^p v^q h^r$, where m is mass, v is velocity and h is Planck's constant. The correct set of values of p, q, r is -

(A) p = 1, q = 1, r = 1 (B) p = -1, q = -1, r = -1

(C) p = -1, q = -1, r = 1 (D) p = 1, q = -1, r = 1

2. A wire is of mass (0.3 ± .003) gm. The radius is (0.5 ± 0.005) cm and length is (6 ± .06) cm. The maximum percentage error in density is -

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(A) 3% (B) 4%

(C) 8%

(D) 16%

3. If force, length and time would have been the fundamental units, what would have been the dimensional formula for mass?

(A) FL⁻¹T² (B) FLT⁻¹ (C) FLT⁻¹ (D) F

Passage (Q.4 to Q.6)

A particle is dropped from height 20m above ground. Due to wind it acquires horizontal acceleration 5 m/s^2 .

- 4. The velocity with which particle hits the ground is
 - (A) 20 m/s (B) $10\sqrt{5}$ m/s
 - (C) $10\sqrt{3}$ m/s (D) $20\sqrt{2}$ m/s
- 5. Drift along horizontal direction as particle hits the ground is -
 - (A) 10 m (B) 15 m
 - (C) $10\sqrt{2}$ m (D) 20 m

6. Assuming initial position of particle to be origin, vertically down ward direction on + ve ydirection, & horizontal direction in the direction of wind blow as + ve x-direction equation of trajectory of particle is -

(A)
$$y = x^2$$

(B) $y = 2x + x^2$
(C) $y = 2x^2$
(D) $y = 2x$

7. A golfer standing on level ground hits a ball with a velocity of u = 52 m/s at an angle α above the horizontal. If $\tan \alpha = 5/12$, then the time for which the ball is at least 15m above the ground (i.e. between A and B) will be (take $g = 10 \text{ m/s}^2$) –



(A) 1 sec

- (C) 3 secs (D) 4 secs
- 8. Two balls are projected from the same point in direction inclined at 60° and 30° to the horizontal. If they attain the same maximum height, what is the ratio of their velocities of projection?
 - (A) $1: \sqrt{3}$ (B) $\sqrt{3}: 1$ (C) 1: 1 (D) 1: 2
- 9. From the top of a tower of height h a body of mass m is projected in the horizontal direction with a velocity v, it falls on the ground at a distance x from the tower. If a body of mass 2m is projected from the top of another tower of height 2h in the horizontal direction so that it falls on the ground at a distance 2x from the tower, the horizontal velocity of the second body is -

(A) 2v
(B)
$$\sqrt{2}$$
 V
(C) $\frac{V}{2}$
(D) $\frac{V}{\sqrt{2}}$

10. A sphere of mass m is held between two smooth inclined walls. For sin $37^{\circ} = 3/5$, the normal reaction of the wall (2) is equal to -



(A) mg

(B) mg sin 74°

(C) mg cos 74°

(D) None of these



11. Two blocks are connected by a massless string through an ideal pulley as shown. A force of 22N is applied on block B when initially the blocks are at rest. Then speed of centre of mass of block A and block B, 2 secs, after the application of force is (masses of A and B are 4 kg and 6 kg respectively and surfaces are smooth) –



12. A rod of length L is sliding such that one of its ends is always in contact with a vertical wall and its other end is always in contact with horizontal surface. Just after the rod is released from rest, the magnitude of acceleration of rod at this instant will be



13. A body of mass m is hauled up the hill with constant speed v by a force such that the force at each point is directed along the tangent to the path. The length of base of hill is L and its height is h. The coefficient of friction between the body and path is μ . Then which of the following statement is incorrect when body moves from bottom to top.

h m L



- (A) work done by gravity is -mgh
- (B) work done by friction is μ mgL
- (C) work done by gravity is path independent
- (D) None of the above
- **14.** Power applied to a particle varies with time as $P = [3t^2 2t + 1]$ watts. Where t is time in seconds. Then the change in kinetic energy of particle between time t = 2s to t = 4s is
 - (A) 46 J (B) 52 J
 - (C) 92 J (D) 104 J
- **15.** A chain of length $\ell < \pi R/2$ is placed on a smooth surface whose some part is horizontal and some part is quarter circular of radius R as shown. Initially the whole part of chain lies in the circular part with one end at top most point of circular surface. If the mass of chain is m then the work required to pull very slowly the whole chain on horizontal part is –



16. One end of a uniform rod of length *l* and mass m is hinged at A. It is released from rest from horizontal position AB as shown in figure. The force exerted by the rod on the hinge when it becomes vertical is -





17. A solid sphere of mass M and radius R is placed on a smooth horizontal surface. It is given a horizontal impulse J at a height h above the centre of mass and sphere starts rolling then, the value of h and speed of centre of mass are –



18. A loop of radius 3 meter and weighs 150 kg. It rolls along a horizontal floor so that its centre of mass has a speed of 15 cm/sec. How much work has to be done to stop it –

(A) 3.375 J	(B) 7.375 J
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- (C) 5.375 J (D) 9.375 J
- **19.** The ' σ ' of a material is 0.20. If a longitudinal strain of 4.0×10^{-3} is caused, by what percentage will the volume change–

(A) 0.48 %	(B) 0.32 %
(C) 0.24 %	(D) 0.50 %

20. A cylinder is of length ℓ and diameter d. On stretching the cylinder, an increment $\Delta \ell$ in length and decrease Δd in diameter are caused. The Poisson ratio is–

(A)
$$\sigma = -\frac{\Delta \ell}{\ell} \times \frac{d}{\Delta d}$$

(B) $\sigma = -\frac{\ell}{d} \times \frac{\Delta d}{\Delta \ell}$
(C) $\sigma = -\frac{\Delta \ell}{\ell} \times \frac{\Delta d}{d}$
(D) $\sigma = -\frac{\ell}{\Delta \ell} \times \frac{d}{\Delta d}$

21. In a wire stretched by hanging a weight from its end, the elastic potential energy per unit volume in terms of longitudinal strain σ and modulus of elasticity Y is -

(A)
$$\frac{Y\sigma^2}{2}$$
 (B) $\frac{Y\sigma}{2}$
(C) $\frac{2Y\sigma^2}{2}$ (D) $\frac{Y^2\sigma}{2}$

22. A cylindrical vessel filled with water is released on an inclined surface of angle θ as shown in figure. The friction coefficient of surface with vessel is μ (< tan θ). Then the constant angle made by the surface of water with the incline will be –





23. A U-tube of base length " ℓ " filled with same volume of two liquids of densities ρ and 2ρ is moving with an acceleration "a" on the horizontal plane. If the height difference between the two surfaces (open to atmosphere) becomes zero, then the height h is given by –



24. A vessel contains oil (density = 0.8 gm/cm³) over mercury (density = 13.6 gm/cm³). A uniform sphere floats with half its volume immersed in mercury and the other half in oil. The density of the material of sphere in gm/cm³ is -

(A) 3.3	(B) 6.4
(C) 7.2	(D) 12.8

25. A body is projected up with a velocity equal to $\frac{3}{4}$ th of the escape velocity from the surface of the earth. The height it reaches from the centre of the earth is: (Radius of the earth = R):

(A)
$$\frac{10R}{9}$$
 (B) $\frac{16R}{7}$

(C)
$$\frac{9 \text{ R}}{8}$$
 (D) $\frac{10 \text{ R}}{3}$



SECTION-B : CHEMISTRY

- 26. The species, having bond angles of 120° is : (A) PH₃ (B) ClF₃ (C) NCl₃ (D) BCl₃
- 27. Which is the least stable resonating structure of the given molecule?



28. For the following heterogeneous phase equilibrium $AgCl(s) + H_2O(l) \implies Ag^+(aq) + Cl^-(aq); \Delta_r H = x kJ/mol$

Which of the following change does not affect the solubility of AgCl in water

- (A) Increase in temperature
- (B) Addition of AgCl(s) at equilibrium
- (C) Addition of NaCl (aq) at equilibrium

(D) Addition of AgNO₃(aq) at equilibrium

29. Match the interhalogen compounds of Column I with the geometry in column II and Assign the correct code.

	Colu	mn I				Colur	nn II			
(a)	XX'				(i)	T-sha	oe			
(b)	XX ₃ '				(ii)	Penta	gonal b	ipyrami	dal	
(c)	XX ₅ '				(iii)	Linear	r			
(d)	XX ₇ '				(iv)	Squar	e-pyran	nidal		
	,				(v)	Tetrah	nedral			
Code	e:									
	(a)	(b)	(c)	(d)			(a)	(b)	(c)	(d)
(1)	(iii)	(iv)	(i)	(ii)	•	(2)	(iii)	(i)	(iv)	(ii)
(3)	(v)	(iv)	(iii)	(ii)		(4)	(iv)	(iii)	(ii)	(i)
The i	nductiv	e effect	s of the	groups	: – CH ₃ ,	$-CO_2^-$, – Br,	$-\mathrm{NH}_3^+$	are resp	pectively
(A) +	- I —I	+ I 🔹	-I			(B) +	I +I	-I -	·I	
(C) +	I – I	-1-	- I			(D) -	I +I	_I +	٠ĭ	

- **31.** The value of K_p is 50 bar at 400 K and 1700 bar at 500 K for reaction $N_2O_4(g) \implies 2NO_2(g)$ then
 - **incorrect** statement is- (**Given** : R = 2 Cal/mol-K, ln 34= 3.5) (A) Enthalpy of reaction (Δ H) is 14 KCal/mol
 - (B) At 400 K if N_2O_4 and NO_2 are mixed at 2 bar and 20 bar respectively then more N_2O_4 will be formed
 - (C) On increasing pressure reaction will move in backward direction
 - (D) At 500 K, $K_C > K_P$

30.

32. Which of the following pairs of compounds is isoelectronic and isostructural? (A) $BeCl_2$, XeF_2 (B) TeI_2 , XeF_2 (C) IBr_2^- , XeF_2 (D) IF_3 , XeF_2



33. Non valid resonating structure of N, N-dimethyl aniline is -



34. Variation of vapour pressure of different liquids with temperature is depicted below :



- (A) Liquid A and B boils at approximately 273 K and 293 K respectively
- (B) Liquid A is more volatile than C
- (C) At 298 K temperature, vapour pressure of liquid C will be maximum
- (D) At high altitude, if atmospheric pressure decreases to 400 mm then both A(l) and B(l) boils at 293 K.
- **35.** Which one of the following pairs of species have the same bond order ? (A) CO, NO (B) O_2 , NO⁺ (C) CN⁻, CO (D) N_2 , O_2
- **36.** Which of the following is a +I group?

$$\begin{array}{cccc} O & O & O \\ \parallel & & & \\ (A) - C - H & (B) - C - Me & (C) - C - NH_2 \end{array} \end{array}$$

37. For 1 mole of different real gases, curves of Z v/s P is plotted at constant temperature. With the help of curves given below, select the **correct** order of liquefiability of gases -





38. Four diatomic species are listed below in different sequence. Which of these represents the correct order of their increasing bond order?

(A)
$$C_2^{2-} < He_2^+ < NO < O_2^-$$

(B) $He_2^+ < O_2^- < NO < C_2^{2-}$
(C) $O_2^- < NO < C_2^{2-} < He_2^+$
(D) $NO < C_2^{2-} < O_2^- < He_2^+$

39. Number of sp^2 hybrid atoms in the following compound is / are?



- 40. De Broglie wavelength of a moving electron in excited state of H atom is thrice of an electron revolving in 4th orbit of Li^{+2} ion, if that electron return to ground state, then maximum number of possible spectral lines that can be observed are [If sample has only 1H-atom] (A) 1 (B) 2 (C) 3 (D) 4
- 41. Which of the following fluoro-compounds is most likely to behave as a Lewis base ? (A) SiF_4 (B) BF_3 (C) PF_3 (D) CF_4
- 42. Which of the following is least stable carbocation?



- 43. Ratio of largest wavelength of Balmer series with smallest wavelength of Brackett series in hydrogen spectrum is(A) 9 : 100
 (B) 20 : 9
 (C) 9 : 20
 (D) 100 : 9
- 44. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules? (A) $F_2 > Cl_2 > Br_2 > I_2$ (B) $I_2 > Br_2 > Cl_2 > F_2$ (C) $Cl_2 > Br_2 > F_2 > I_2$ (D) $Br_2 > I_2 > F_2 > Cl_2$
- **45.** Give the correct order of acidic strength of mentioned groups.





- Number of electrons in Cu atom having (n+l+m) = 4 is -46. (A) 1 (B) 3 (C) 5 (D) 7
- 47. Consider the molecules CH₄, NH₃ and H₂O. Which of the given statement is **false**? (A) The H–C–H bond angle is CH_4 is larger than the H–N–H bond angle is NH_3 (B) The H–C–H bond angle is CH_4 , the H–N–H bond angle in NH_3 and the H–O–H bond angle in H_2O are all greater than 90°. (C) The H–O–H bond angle in $\rm H_2O$ is larger than the H–C–H bond angle in $\rm CH_4$ (D) The H–O–H bond angle in H₂O is smaller than the H–N–H bond angle in NH₃
- Which base is weakest? **48.** (A) H₂N – CH₂ – CH₃ (A) $H_2N - CH_2 - CH_3$ (C) $H_3C - CH_2 - NH - CH_2 - CH_3$ (B) $HN = CH - CH_3$ (D) $H_{C} - C \equiv N$.

For $H_2(g)$ and He(g), at moderate temperature, Vander Waal equation can be represented as -**49**.

(A)
$$\left(P + \frac{a}{V_m^2}\right) (V_m) = RT$$

(B) $PV_m - Pb = RT$
(C) $PV_m = RT$
(D) $PV_m = RT - Pb$

NDATIO Which of the following are peroxoacids of sulphur? 50. (B) H_2SO_5 and $H_2S_2O_7$ (A) H_2SO_5 and $H_2S_2O_8$ (D) $H_2S_2O_6$ and $H_2S_2O_7$ (C) $H_2S_2O_7$ and $H_2S_2O_8$

SECTION-C : MATHEMATICS

- 51. If all the six letters words (with or without meaning) formed using the letters of the word 'FLOWER' and arranged as in dictionary, then the rank of the word 'FLOWER' is (A) 153 (B) 154 (C) 155 (D) 156
- The locus of the middle point of the chord of the circle $x^2 + y^2 12x + 4y + 4 = 0$, that subtends an angle 52.

 $\frac{2\pi}{3}$ at the centre is (A) $x^2 + y^2 - 12x + 4y + 30 = 0$ (B) $x^2 + y^2 - 12x + 4y + 31 = 0$ (D) $x^2 + y^2 + 12x + 4y + 30 = 0$ (C) $x^2 + y^2 + 12x + 4y + 31 = 0$

- If point (0, a) lies inside the triangle formed by the lines y + 3x + 2 = 0, 3y 2x 5 = 0 and **53**. 4y + x - 14 = 0, then the number of possible integral values of a is (A) 4 (B) 3 (C) 2(D) 1
- If the area of a triangle is 96, and the radii of the escribed circles are 8, 12 and 24, then the perimeter of 54. the triangle is equal to (A) 24 (B) 48 (C) 36 (D) 18

Sample Paper (SET-1) | JEE



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55.	Sum of all integral va	alues in the range of the	e rational expre	ssion y = $\frac{x^2 - x - 1}{x^2 + x + 1}$, $\forall x \in R$ is equal to
	(A) – 2	(B) – 1	(C) 0	(D) 2	
56.	The value of $\sum_{n=1}^{\infty} \frac{(3)^n}{n(4n)^n}$	$\frac{(n+4)}{(n+4)\cdot 4^n}$ is equal to			
	(A) $\frac{1}{5}$	(B) $\frac{1}{4}$	(C) $\frac{1}{25}$	(D)	$\frac{1}{16}$
57.	If $\log x - \log y = 3$ at	rd(x - y) = 666 then (x + y) is equal t	o (base of logarithm	n is 10)
0.11	2002	1998	2000	1000	
	(A) $\frac{2002}{3}$	(B) $\frac{1330}{3}$	(C) $\frac{2000}{3}$	(D) $\frac{1000}{999}$	
58.	If α , β are the roots of	of the equation $8x^2 - 3x^2$	x + 27 = 0, then	the value of $\left(\frac{\alpha^2}{\beta}\right)^{\frac{1}{3}}$	$+\left(\frac{\beta^2}{\alpha}\right)^{\frac{1}{3}}$ is
	(A) $\frac{1}{3}$	(B) $\frac{1}{4}$	(C) $\frac{1}{5}$	(D) $\frac{1}{6}$	
-					
59.	The number of integr	al values of λ for which $\lambda = 4$ is	$h x^2 + y^2 + 2\lambda x +$	$-2(1-\lambda)y+9=0$ is	the equation of a circle
	(A) 1	(B) 2	(C) 3	(D) 4	
			6		
60.	In a $\triangle ABC$, if $\begin{vmatrix} 1 & a \\ 1 & c \\ 1 & b \end{vmatrix}$	$\begin{vmatrix} b \\ a \\ c \end{vmatrix} = 0$, then value of	$\tan^2\left(\frac{A}{2}\right) + \tan^2$	$2\left(\frac{B}{2}\right) + \tan^2\left(\frac{C}{2}\right)$ is	equal to
	[Note: All symbols u	used have usual meaning	g in $\triangle ABC.$]		
	(A) – 1	(B) 0	(C) 1	(D) $\frac{1}{3}$	
61.	Sum of all integral va	lues of a for which one	e root of equation	$n(a-5)x^2-2ax+a$	a - 4 = 0 is smaller than
010	1 and the other greate	er than 2, must be equa	l to		
	(A) 255	(B) 260		(C) 261	(D) 263
62.	If $x + y + z = 9$ where (A) 3	e x, y, $z > 0$, then the m	$\begin{array}{c} \text{maximum value} \\ (C) 27 \end{array}$	of xyz is (D) 81	
	(1) 5		(C) 21	(D) 01	
63.	The number of ways come together is	the letters of the wor	rd. 'COMBINA'	FION' be permuted	so that no two vowels

(A) $\frac{7! \cdot 6!}{(2!)^3}$ (B) $\frac{7! \cdot 6!}{(2!)^4}$ (C) $\frac{7! \cdot 6! \cdot 5!}{(2!)^3}$ (D) $\frac{7! \cdot 6! \cdot 5!}{(2!)^4}$

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The equation of the circle described on the common chord of the circle $x^2 + y^2 + 2x = 0$ and 64. $x^2 + y^2 + 2y = 0$ as diameter is (1) $\dot{x}^2 + \dot{y}^2 + x - y = 0$ (2) $x^2 + y^2 - x + y = 0$ (4) $x^2 + y^2 + x + y = 0$ (3) $x^2 + y^2 - x - y = 0$ The number of solution(s) of the equation $\left(2\sin\frac{x}{2}-1\right)(\cos x+2)=0$ in $[0, \pi]$ is **65**. (A) 4 (B) 3 (D) 1 If a_1, a_2, a_3, \dots are in A.P. and $a_1 + a_4 + a_7 + a_{10} + a_{13} + a_{16} = 375$, then value of $\sum_{i=1}^{16} a_i$ is equal to **66**. (B) 1000 (A) 800 (C) 1100 (D) 1200 67. Rajdhani express bound from Kota to Bombay stops at 10 intermediate stations. 5 passengers enter the train during the journey holding 5 different tickets of the AC class or sleeper class. How many different set of tickets they may have had. (C) ${}^{45}C_{5}$ (A) ${}^{55}C_{5}$ (B) ${}^{110}C_{\epsilon}$ (D) ${}^{90}C_{\epsilon}$ If the three equations $x^2 + px + 12 = 0$, $x^2 + qx + 15 = 0$ and $x^2 + (p + q)x + 36 = 0$ have a common **68**. positive root and α , β , γ be respectively their other roots, then $\alpha + \beta + \gamma$ is equal to (D) 25 (C) 24 (A) 20 (B) 21 If $\cot\left(\frac{\pi}{3}\cos 2\pi x\right) = \sqrt{3}$, then the general solution of the equation is 69. (A) $x = n \pm \frac{1}{2}$, $(n \in I)(B) x = n \pm \frac{1}{3}$, $(n \in I)(C) x = n \pm \frac{1}{6}$, $(n \in I)(D) x = n \pm \frac{1}{4}$, $(n \in I)$ 70. There are 20 persons including two brothers. In how many ways can they be seated on a round table if two brothers are never sit together is (C) 17 (18!) (D) 18 (17!) (B) 18 (18!) (A) 17 (17!) Combined equation of line joining the origin to the points of intersection of $2x^2 + 3xy - 4x + 1 = 0$ and 71. 3x + y = 1 is given by (A) $x^2 + y^2 - 5xy = 0$ (B) $x^2 - y^2 + 5xy = 0$ (C) $x^2 - y^2 - 5xy = 0$ (D) $x^2 + y^2 + 5xy = 0$ If sides of a triangle are 3, 4 & 6 units, then triangle is 72. (C) obtuse angled (A) acute angled (B) right angled (D) none 73. The digits of the number 1 2 2 3 1 1 are arranged in all possible ways. The number of all different numbers greater than 300000 are (A) 10 (B) 12 (C) 32 (D) 120 The radical centre of three circles described on the three sides 4x - 7y + 10 = 0, x + y - 5 = 0 and 74. 7x + 4y - 15 = 0 of a triangle as diameters is (A)(2,1)(D) (-6, -2)(B)(1,2)(C)(2,3)



75. If maximum and minimum values of $1 + \sin\left(\frac{\pi}{4} + \theta\right) + 2\cos\left(\frac{\pi}{4} - \theta\right)$ where $\theta \in \mathbb{R}$, are M and m respectively then (M + m) is equal to (A) - 2 (B) 0 (C) 2 (D) 4

ADMISSION TEST (JEE) | SAMPLE PAPER Set-1 COURSE : XII One Year (XI going to XII)

			ANS	SW	ER K	EY			
1.	(C)	16.	(B)	31.	(D)	46.	(D)	61.	(C)
2.	(B)	17.	(A)	32.	(C)	47.	(C)	62.	(C)
3.	(A)	18.	(A)	33.	(D)	48.	(D)	63.	(B)
4.	(B)	19.	(B)	34.	(B)	49.	(B)	64.	(D)
5.	(A)	20.	(A)	35.	(C)	50.	(A)	65.	(D)
6.	(B)	21.	(A)	36.	(D)	51.	(C)	66.	(B)
7.	(B)	22.	(В)	37.	(A)	52.	(B)	67.	(B)
8.	(A)	23.	(C)	38.	(B)	53.	(C)	68.	(B)
9.	(B)	24.	(B)	39.	(A)	54.	(B)	69.	(C)
10.	(A)	25.	(B)	40.	(C)	55.	(C)	70.	(C)
11.	(A)	26.	(D)	41.	(C)	56.	(B)	71.	(C)
12.	(C)	27.	(C)	42.	(D)	57.	(A)	72.	(C)
13.	(B)	28.	(B)	43.	(C)	58.	(B)	73.	(A)
14.	(A)	29.	(B)	44.	(C)	59.	(B)	74.	(B)
15.	(C)	30.	(B)	45.	(C)	60.	(C)	75.	(C)