

STaRT-2012 SAMPLE TEST PAPER CLASS-XII (SC.-MATHS)

Time : 90 min.

Maximum Marks : 200

GENERAL INSTRUCTIONS

- 1. he question paper contains 50 questions, 15 questions from Physics (1-15), 10 questions from Chemistry (16-25), 15 Questions from Mathematics (26-40) and 10 questions from Mental Ability (41-50).
- 2. The OMR sheet given in the examination hall is the Answer Sheet.
- 3. Blank papers, clip boards, log tables, slide rule, calculators, mobile or any other electronic gadgets in any form is not allowed.
- 4. Do not forget to mention your roll number neatly and clearly in the blank space provided in the answer sheet.
- 5. Each Question carries 4 marks. '1' mark will be deduct for each wrong answer. So attempt each question carefully.
- 6. No rough sheets will be provided by the invigilators. All the rough work is to be done in the blank space provided in the question paper.
- 7. In case of any dispute, the answer filled in the OMR sheet available with the institute shall be final.

Name : _____

Roll No. : _____

Resonance Eduventures Pvt. Ltd.

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1. At t = 0 a particle at (1, 0, 0) moves towards (4, 4, 12) with a constant velocity of magnitude of 65m/s. The position of the particle is measured in metre and time in second. The position of the particle at t = 2 s is:

- (A) $(13\hat{i} 120\hat{j} + 40\hat{k}) m$ (B) $(40\hat{i} + 31\hat{j} 120\hat{k}) m$ (C) $(16\hat{i} + 20\hat{j} + 60\hat{k}) m$ (D) $(31\hat{i} + 40\hat{j} + 120\hat{k}) m$
- **2.** What is the angle between $\hat{i} + \hat{j} + \hat{k} & \hat{i}$:

(A)
$$\frac{\pi}{6}$$
 (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) none

- **3.** A particle is moving in a circle :
 - (A) The resultant force on the particle must be towards the centre.
 - (B) The resultant force may be towards the centre.
 - (C) The direction of the angular acceleration and the angular velocity must be same.
 - (D) The cross product of the tangential acceleration and the angular velocity will be zero.
- A parallel beam of particles of mass 'm' moving with velocity 'v' impinges on a wall at an angle θ to its normal. The number of particles per unit volume in the beam is 'n'. If the collision of particles with the wall is elastic, then the pressure exerted by this beam on the wall is :

 (A) 2 mn v² cos θ
 (B) 2 mn v² cos² θ
 (C) 2 mn v cos θ
 (D) 2 mn v cos² θ
- 5. A box 'A' is lying on the horizontal floor of the compartment of a train running along horizontal rails from left to right. At time 't', it decelerates. Then the reaction R by the floor on the box is given best by :



6. A force $\vec{F} = 6\hat{i} - 8\hat{j} + 10\hat{k}$ N produces acceleration 1 m/s² in a body. The mass of the body is (in kg) :

(A) $6\hat{i} - 8\hat{j} + 10\hat{k}$ (B) $10\sqrt{2}$ (C) 100 (D) 10

7. A ring rolls without sliding on a horizontal surface with a velocity of 10 m/s. It ascends a smooth continuous track as shown in the figure. The height upto which it will ascend is :



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8. The equation of motion of a particle having mass 1 g is $\frac{d^2x}{dt^2} + \pi^2 x = 0$, where x is displacement (in m) from mean position. The frequency of oscillation is (in Hz) :

(A)
$$\frac{1}{2}$$
 (B) 2 (C) $5\sqrt{10}$ (D) $\frac{1}{5\sqrt{10}}$

- A body of mass 2 kg is moving under the influence of a central force whose potential energy is given by U (r) = 2r³ J. If the body is moving in a circular orbit having radius 5m, its energy will be :
 (A) 625 J
 (B) 250 J
 (C) 500 J
 (D) 125 J
- **10.** Work done by all the forces on a system of particles is equal to :
 - (A) Change in kinetic energy of the system
 - (B) Change in potential energy of the system
 - (C) Change in total energy of the system
 - (D) Change in kinetic energy only if the forces acting are conservative.
- 11. A block of mass 10 kg is suspended through two light spring balances as shown in figure.



- (A) Both the spring balances will read 10 kg.
- (B) Both the spring balances will read 5 kg.
- (C) The upper spring balance will read 10 kg and the lower spring balance will read zero.
- (D) The individual readings of spring balances may be anything but their sum will be 10 kg.
- 12. Consider the situation as shown in the figure. The wall is smooth but the surface of A and B in contact are rough. The friction on B due to A in equilibrium state of the system :
 (A) is upward
 (B) is downward



(C) is zero

(D) the system cannot remain in equilibrium.

13. Two semi circular rings of uniform linear mass densities λ and 2λ of radius 'R' each are joined to form a complete ring. The distance of the center of mass of complete ring from its geometrical centre is :

(A) $\frac{3R}{8\pi}$ (B) $\frac{2R}{3\pi}$ (C) $\frac{3R}{4\pi}$

(D) none of these



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14. A tube in vertical plane is shown in figure. It is filled with a liquid of density ρ and its end B is closed. Then the force exerted by the fluid on the tube at end B will be : [Neglect atmospheric pressure and assume the radius of the tube to be negligible in comparison to ℓ] (A) 0 (B) $2\rho g \ell A_0$ (C) $\rho g \ell A_0$ (D) Cannot be determined



15. An electromagnetic wave travelling through a transparent medium is given by

PAGE #3

 $E_{x}(y,t) = E_{ox} \sin 2\pi \left[\frac{y}{5 \times 10^{-7}} - 3 \times 10^{14} t \right]$ in SI unit then the refractive index of medium is : (A) 1.2 (B) 1.50 (C) 1.33 (D) 2

- 16.Which of the following has maximum ionization potential :
(A) Be(B) K(C) Na(D) Mg
- **17.** If ΔE° is heat of reaction for combustion of ethanol (liquid) at constant volume at 298 K, then heat of reaction at constant pressure, ΔH° will be : (A) $\Delta H^{\circ} = \Delta E^{\circ} - RT$ (B) $\Delta H^{\circ} = \Delta E^{\circ} + RT$ (C) $\Delta H^{\circ} = \Delta E^{\circ} + 2RT$ (D) $\Delta H^{\circ} = \Delta E^{\circ} - 2RT$
- **18.** Which of the following are isostructural : (A) XeF_2 , IF_2^- (B) NH_3 , BF_3 (C) CO_3^{2-} , SO_3^{2-} (D) PCI_5 , $IC\ell_5$
- **19.** 5 mole of SO₂ and 5 moles of O₂ are allowed to react to form SO₃ in a closed vessel. At the equilibrium stage 60% of SO₂ is used up. The total number of moles of SO₂, O₂ and SO₃ in the vessel now is : (A) 8 (B) 6.5 (C) 9.5 (D) 8.5
- 20.In which of the following minerals aluminium is not present :
(A) Cryolite(B) Mica(C) Fledspar(D) fluorspar
- In a closed insulated container, a liquid is stirred with a paddle to increase the temperature. Which of the following is true ?
 (A) ΔE ≠ 0, W ≠ 0, q = 0
 (B) ΔE = 0, W ≠ 0, q ≠ 0

	- , - , - , - , - , - , - , - , - , - ,	()	- ,	- , .
C) ∆E ≠	$0, W = 0, q \neq 0$	(D) ∆E	= q = 0), W ≠ 0

22. The correct IUPAC name of the following compound is :



- (A) Methyl 4-chloro-2-ethyl-5, 5-dimethylcyclohexanol
- (B) 1, 1-Dimethyl-2-methoxy-3-ethyl-5-chlorocyclohexane
- (C) 5-Chloro-3-ethyl-2-methoxy-1, 1-dimethylcyclohexane
- (D) 1-Chloro-5-ethyl-4-methoxy-3, 3-dimethylcyclohexanol









IIT-JEE | AIPMT | AIEEE | OLYMPIADS | KVPY | NTSE A bag contains 9 cards numbered as 1, 2,.....9. Cards are drawn one by one without replacement 30. till an odd number comes. Probablity that it comes in 3rd draw is (A) 1/7 (B) 3/8 (C) 5/42 (D) 1/2 31. The number of ways in which the digits of the number 125453752 can be arranged such that no two '5' s come together is (A) $\frac{9!}{3! \times 2!}$ (C) $\frac{{}^{7}C_{3}x6!}{2!}$ (D) $\frac{3! \times 2!}{7!}$ (B) $\frac{7!}{3! \times 2!}$ Mirror image of (1, 4) in the tangent at (0, 0) on the circle $x^2 + y^2 - x + y = 0$ is 32. (C) $(\sqrt{2}, 1)$ (D) $\left(\frac{1}{\sqrt{2}}\right)$ (B) (1, 2) (A) (4, 1) 33. If $\sin x = \cos^2 x$, then $\cos^2 x (1 + \cos^2 x)$ equals (D) none of these (C) 2 (A) 0 (B) 1 a₁, a₂, a₃ are in an A.P. If a₁ + a₅ + a₁₀ + a₁₅ + a₂₀ + a₂₄ = 225, then sum of its first 24 terms is (A) 800 (B) 900 (C) 700 (D) 1000 34. > and <h > ho two cogueros =: 35.

PAGE #5

$$n < a_n > and < b_n > be two sequence given by$$

$$a_n = x^{2^{-n}} + y^{2^{-n}}$$
 and $b_n = x^{2^{-n}} - y^{2^{-n}}$, $\forall n \in W$, then the value of $a_1 a_2 a_3$ a_n is
 $+ y$
(B) $\frac{x - y}{b_n}$ (C) $\frac{x^2 + y^2}{b_n}$ (D) $\frac{x^2 - y^2}{b_n}$

(A)
$$\frac{x+y}{b_n}$$
 (B) $\frac{x-y}{b_n}$ (C) $\frac{x^2+y^2}{b_n}$ (B)

The solution set of $|x^2 - 4| + (x + 2)^2 + \sqrt{x^2 + 3x + 2} = 0$ is 36. $(A) \ x \in (-\infty, -2] \cup [-1, \infty)$ (B) $x \in \{-2, 2\}$ (C) $x \in \{-2\}$ (D) $x \in \{-2, -1, 2\}$

37. Set of all real values of p such that both the roots of the equation $(p - 5)x^2 - 2px + (p - 4) = 0$ are positive, one is less than 2 and other is lying between 2 & 3, is

(A)
$$\left(\frac{49}{4}, 24\right)$$
 (B) $(5, \infty)$ (C) $(-\infty, 4) \cup \left(\frac{49}{4}, \infty\right)$ (D) $\left(4, \frac{49}{4}\right)$

38. If
$$\sin^{-1} x + \cot^{-1} \left(\frac{1}{x} \right) = \frac{\pi}{2}$$
, then x is equal to

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(A)
$$\sqrt{\frac{2}{\sqrt{5}-1}}$$
 (B) $\sqrt{\frac{\sqrt{5}+1}{2}}$ (C) $\sqrt{\frac{\sqrt{5}-1}{2}}$ (D) none of these





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'A # B' means 'A is either smaller than or equal to B';

In each question, two statements followed by two conclusions I and II are given. Assuming the statement to be true, state which of the conclusions I and II is / are definitely true ?

Give answer (A) if only conclusion I is true; (B) if only conclusion II is true; (C) if either I or II is true; and (D) if both I and II are true.

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44.	Statements : P # Q,	M ● N \$ P					
	Conclusions : I. M	⊉P II.N≠	‡ Q				
45.	Statements : $L \bullet M$	1, R●T\$L					
	Conclusions : 1. $1 \bullet \mathbb{N}$	/ II.R@L					
46.	How many squares do	es the figure have	ə?				
						EP	
	(A) 10 (C) 12	(B*) 11 (D) 14					
47.	Introducing a girl, Vipi	oducing a girl, Vipin said, "Her mother is the only daughter of my mother – in – law. "How is Vipin					
	(A) Uncle	(B*) Father		(C) Brother		(D) Husband	
48.	Ram is to the South- Suresh is to the Nort located ? (A) North-West	East of Mukesh h of Ram and N (B) South-Wes	Shyam orth-We	is to the East of st of Shyam, in v (C*) North-East	f Mukesh which dir t	and North-E ection of Muk (D) South-Ea	ast of Ram. If esh is Suresh st
Direc	tions: (49 to 50) Fill the on pyramids. a b c d e f 9 h i j k l m n o q r s t u v w z	blanks in the follo p x y	owing qu	estions from the c	choice giv	ren below. Wh	ich are based
49.	elu : adi : : ? : abe (A) fmv	(B) dgl		(C) hmt		(D*) inu	
50.	flt : klm : : iow : ? (A) hnv	(B) mno		(C*) nop		(D) gmu	
	ANSW	'ER					
1.	(D) 2. (D) 3.	(B) 4 .	(B)	5. (C)	6. (B)	7. (B)	8. (A)
9.	(A) 10. (A) 11	I. (A) 12 .	(D)	13. (B)	14. (C)	15. (D)	16. (A)

20. (D)

(B)

(A)

(B)

28.

36.

44.

21. (A)

29. (B)

37. (C)

45. (A)

22. (C)

30. (C)

38. (C)

46. (B)

23. (B)

31. (C)

39. (C)

47. (B)

24. (C)

32. (A)

40. (C)

48. (C)

19. (D)

27.

35.

43.

(B)

(C)

(B)

17. (A)

25. (C)

33. (B)

41. (B)

49. (D)

18. (A)

26. (B)

34. (C)

42. (D)

50. (C)