

REVIEW TEST - 1
CLASS – XII

Date :- 23– 05 - 2010

Duration : 3 Hours

Max. Marks : 258

PAPER – 2

INSTRUCTIONS

Each of the three parts of the paper contains Section-A, Section-B & Section-C. Section-A contains 6 question, Section-B contains 2 questions and Section-C contains 8 questions. Total number of pages are **24**. Please ensure that the Questions paper you have received contains ALL THE QUESTIONS in each part and section and PAGES.

SECTION - A

1. Question 1 to Question 6 has four choices (A), (B), (C), (D) Out of which **one or more than one is/are correct** and carry **5 marks** each. 2 mark will be deducted for each wrong answer.

SECTION - B

2. Questions 1 to Questions 2 are **Match The Column Type** questions. **Column-I** contains Four (A,B,C,D) entries and **Column-II** contains Five (P,Q,R,S,T) entries. In Questions 1 Entry of **Column-I** are to be matched with **only one entry** of **Column-II** or **vice versa**. In Question 2 Entry of **Column-I** are to be matched with **one or more than one entries** of **Column-II** or **vice versa**. **3 mark** will be awarded for each part of **Column-I**. **NO NEGATIVE** marking for this section.

SECTION - C

3. Questions 1 to Questions 8 are **integer answer type questions** (whose answers are upto 4 digits) & carry **4 marks** each. **NO NEGATIVE** marking for this section.

NOTE : GENERAL INSTRUCTION FOR FILLING THE OMR ARE GIVEN BELOW.

- Use only **HB pencil** or **blue/black pen** (avoid gel pen) for darkening the bubble.
- Indicate the correct answer for each question by filling appropriate bubble in your OMR answer sheet.
- The Answer sheet will be checked through computer hence, the answer of the question must be marked by shading the circles against the question by dark **HB pencil** or **blue/black pen**.
- While filling the bubbles please be careful about SECTIONS [i.e. Section-A include multi correct answers), Section-B (include match the column), Section-C (include integer answer type)].

SECTION-A	SECTION-B	SECTION-C																																																																																																
<p>For example if only 'A' choice is correct then, the correct method for filling the bubble is</p> <p>A B C D E ● ○ ○ ○ ○</p> <p>For example if only 'A & C' choices are correct then, the correct method for filling the bubble is</p> <p>A B C D E ● ○ ● ○ ○</p> <p>the wrong method for filling the bubble are</p> <p>☑ ☒ ☓ ☔ ☕</p> <p>The answer of the questions in wrong or any other manner will be treated as wrong.</p>	<p>For example If Correct match for (A) is P; for (B) is R, S; for (C) is Q; for (D) is P, Q, S then the correct method for filling the bubble is</p> <table border="0"> <tr> <td></td> <td>P</td> <td>Q</td> <td>R</td> <td>S</td> <td>T</td> </tr> <tr> <td>A</td> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>B</td> <td>○</td> <td>○</td> <td>●</td> <td>●</td> <td>○</td> </tr> <tr> <td>C</td> <td>○</td> <td>●</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>D</td> <td>●</td> <td>●</td> <td>○</td> <td>●</td> <td>○</td> </tr> </table>		P	Q	R	S	T	A	●	○	○	○	○	B	○	○	●	●	○	C	○	●	○	○	○	D	●	●	○	●	○	<p>Ensure that all columns are filled. Answers, having blank column will be treated as incorrect. Insert leading zero(s) if required :</p> <table border="0"> <tr> <td>'6' should be filled as 0006</td> <td>'86' should be filled as 0086</td> <td>'1857' should be filled as 1857</td> </tr> <tr> <td> <table border="1"> <tr><td>●●●●</td><td>○</td></tr> <tr><td>①①①①</td><td>○</td></tr> <tr><td>②②②②</td><td>○</td></tr> <tr><td>③③③③</td><td>○</td></tr> <tr><td>④④④④</td><td>○</td></tr> <tr><td>⑤⑤⑤⑤</td><td>○</td></tr> <tr><td>⑥⑥⑥●</td><td>○</td></tr> <tr><td>⑦⑦⑦⑦</td><td>○</td></tr> <tr><td>⑧⑧⑧⑧</td><td>○</td></tr> <tr><td>⑨⑨⑨⑨</td><td>○</td></tr> </table> </td> <td> <table border="1"> <tr><td>●●○①</td><td>○</td></tr> <tr><td>①①①①</td><td>○</td></tr> <tr><td>②②②②</td><td>○</td></tr> <tr><td>③③③③</td><td>○</td></tr> <tr><td>④④④④</td><td>○</td></tr> <tr><td>⑤⑤⑤⑤</td><td>○</td></tr> <tr><td>⑥⑥⑥●</td><td>○</td></tr> <tr><td>⑦⑦⑦⑦</td><td>○</td></tr> <tr><td>⑧⑧●⑧</td><td>○</td></tr> <tr><td>⑨⑨⑨⑨</td><td>○</td></tr> </table> </td> <td> <table border="1"> <tr><td>○④④④</td><td>○</td></tr> <tr><td>①①①①</td><td>○</td></tr> <tr><td>②②②②</td><td>○</td></tr> <tr><td>③③③③</td><td>○</td></tr> <tr><td>④④④④</td><td>○</td></tr> <tr><td>⑤⑤●⑤</td><td>○</td></tr> <tr><td>⑥⑥⑥⑥</td><td>○</td></tr> <tr><td>⑦⑦⑦●</td><td>○</td></tr> <tr><td>⑧●⑧⑧</td><td>○</td></tr> <tr><td>⑨⑨⑨⑨</td><td>○</td></tr> </table> </td> </tr> </table>	'6' should be filled as 0006	'86' should be filled as 0086	'1857' should be filled as 1857	<table border="1"> <tr><td>●●●●</td><td>○</td></tr> <tr><td>①①①①</td><td>○</td></tr> <tr><td>②②②②</td><td>○</td></tr> <tr><td>③③③③</td><td>○</td></tr> <tr><td>④④④④</td><td>○</td></tr> <tr><td>⑤⑤⑤⑤</td><td>○</td></tr> <tr><td>⑥⑥⑥●</td><td>○</td></tr> <tr><td>⑦⑦⑦⑦</td><td>○</td></tr> <tr><td>⑧⑧⑧⑧</td><td>○</td></tr> <tr><td>⑨⑨⑨⑨</td><td>○</td></tr> </table>	●●●●	○	①①①①	○	②②②②	○	③③③③	○	④④④④	○	⑤⑤⑤⑤	○	⑥⑥⑥●	○	⑦⑦⑦⑦	○	⑧⑧⑧⑧	○	⑨⑨⑨⑨	○	<table border="1"> <tr><td>●●○①</td><td>○</td></tr> <tr><td>①①①①</td><td>○</td></tr> <tr><td>②②②②</td><td>○</td></tr> <tr><td>③③③③</td><td>○</td></tr> <tr><td>④④④④</td><td>○</td></tr> <tr><td>⑤⑤⑤⑤</td><td>○</td></tr> <tr><td>⑥⑥⑥●</td><td>○</td></tr> <tr><td>⑦⑦⑦⑦</td><td>○</td></tr> <tr><td>⑧⑧●⑧</td><td>○</td></tr> <tr><td>⑨⑨⑨⑨</td><td>○</td></tr> </table>	●●○①	○	①①①①	○	②②②②	○	③③③③	○	④④④④	○	⑤⑤⑤⑤	○	⑥⑥⑥●	○	⑦⑦⑦⑦	○	⑧⑧●⑧	○	⑨⑨⑨⑨	○	<table border="1"> <tr><td>○④④④</td><td>○</td></tr> <tr><td>①①①①</td><td>○</td></tr> <tr><td>②②②②</td><td>○</td></tr> <tr><td>③③③③</td><td>○</td></tr> <tr><td>④④④④</td><td>○</td></tr> <tr><td>⑤⑤●⑤</td><td>○</td></tr> <tr><td>⑥⑥⑥⑥</td><td>○</td></tr> <tr><td>⑦⑦⑦●</td><td>○</td></tr> <tr><td>⑧●⑧⑧</td><td>○</td></tr> <tr><td>⑨⑨⑨⑨</td><td>○</td></tr> </table>	○④④④	○	①①①①	○	②②②②	○	③③③③	○	④④④④	○	⑤⑤●⑤	○	⑥⑥⑥⑥	○	⑦⑦⑦●	○	⑧●⑧⑧	○	⑨⑨⑨⑨	○
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PART - I [MATHEMATICS]

SECTION - (A)

[MULTIPLE CORRECT TYPE]

Q.1 to 6 has four choices (A), (B), (C), (D) out of which **ONE OR MORE THAN ONE** is/are correct

1. Which of the following statement(s) is/are correct (where $\min(a, b)$ denotes smaller of the two real number 'a' and 'b')
- (A) $f(x) = \min(\tan x, |x|)$ is periodic. (B) $f(x) = \min(\sin x, |x|)$ is periodic.
 (C) Equation $\tan x = |x|$ has exactly one root. (D) Equation $\sin x = |x|$ has exactly one root.
2. If $\lim_{x \rightarrow \infty} \frac{e^{kx} + 1001}{e^{5x} + 93}$ does not exist then 'k' may be.
- (A) 3 (B) 5 (C) 9 (D) 12

(SPACE FOR ROUGH WORK)



3. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \max(|x|, 2 - |x|)$. Then which of the following hold (s) good ?
 (where $\max(a, b)$ denotes larger of the two real number 'a' and 'b')
 (A) range of f is $[0, \infty)$ (B) f is aperiodic
 (C) f is neither even nor odd (D) f is neither injective nor surjective
4. The value(s) of a for which $a(x^2 + x + 1) + \sec^{-1} \sqrt{2x^2 - x^4} + \operatorname{cosec}^{-1} \sqrt{2x^2 - x^4} = 0$
 (A) $\frac{\pi}{2}$ (B) $-\frac{\pi}{2}$ (C) $-\frac{\pi}{6}$ (D) $\frac{\pi}{6}$
5. The equation $\sin^{-1}(x^2 + x + 1) + \cos^{-1}(\lambda x + 1) = \frac{\pi}{2}$ has exactly two solutions for $\lambda \in [a, b)$, then which of the following statement (s) is/are true
 (A) $a + b = 2$ (B) (a, b) satisfies the curve $y^2 - x^2 = -1$
 (C) $a + b = 1$ (D) (a, b) satisfies the curve $y = x + 1$
6. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \cos^{-1}(\{-x\})$ then which of the following is/are correct
 (where $\{ \cdot \}$ denotes fractional part function)
 (A) f is many one but not even function (B) Range of f contains two prime numbers.
 (C) f is aperiodic (D) Graph of f does not lie below x-axis.

(SPACE FOR ROUGH WORK)



SECTION - (B)

[MATCH THE COLUMN]

Q.1 is "Match the Column" type. Column - I Contains four (i.e. A,B, C,D) entries and column-II contains five (i.e. P,Q,R,S,T) entries. Entry of column-I are to be matched with **only one entry** of column-II or vice versa.

1.	Column – I	Column – II
(A)	If $\lim_{x \rightarrow 0} \left(x^{-3} \sin 3x - 3ax^{-2} + \frac{9}{2} \right) = 0$; then a is equal to.	(P) 1
(B)	If $\lim_{x \rightarrow -\infty} \left((x^5 + 7x^4 + 2)^a - x \right) = b$, then $3a + b$ is equal to	(Q) 2
(C)	$\lim_{x \rightarrow \frac{\pi}{4}} \frac{4\sqrt{1 - \sqrt{\sin 2x}}}{\pi - 4x}$ is equal to	(R) $\frac{1}{2}$
(D)	$\lim_{x \rightarrow \infty} \frac{e^{\frac{1}{x^2}} - 1}{\pi - 2 \tan^{-1} x^2}$ is is equal to	(S) $-\frac{1}{2}$
		(T) does not exist

(SPACE FOR ROUGH WORK)



Q.2 is "Match the Column" type. Column - I Contains four (i.e. A,B, C,D) entries and column-II contains five (i.e. P,Q,R,S,T) entries. Entry of column-I are to be matched with **one or more than one entries** of column-II or vice versa.

2. Note : { * } denotes fractional part function & [*] denotes greatest integer function

- | Column – I | Column – II |
|--|--------------------|
| (A) Number of integral point(s) in domain of function
$f(x) = \sqrt{\log_3(\cos^{-1} x)}$ is/are | (P) 0 |
| (B) If $f(x) = \frac{1}{1-x}$, then $f(f(f(x)))$ is not defined for x equal to | (Q) 1 |
| (C) The value of $\left[5 \tan^{-1}(\cos(\tan^{-1}\{s\})) \right]$ equals
where $s = \lim_{x \rightarrow 0} \operatorname{sgn}\left(\frac{\tan x}{x}\right)$ and | (R) 2 |
| (D) $\lim_{x \rightarrow 8} \left[\frac{\sin\{x+10\}}{\{x+10\}} \right]$ is equal to | (S) 3 |
| | (T) does not exist |

(SPACE FOR ROUGH WORK)



SECTION - (C)

[INTEGER ANSWER TYPE]

Q. 1 to 8 are Integer Answer type Questions. (The answer of each of the questions are upto 4 digits)

1. If α, β are the roots of $x^2 + px + q = 0$ and also of $x^{2n} + p^n x^n + q^n = 0$, and if $\frac{\alpha}{\beta}, \frac{\beta}{\alpha}$ are the roots of $x^n + 1 + (x + 1)^n = 0$, where $n \in \{1, 2, 3, \dots, 10\}$ then the number of possible values of n are

2. Let $f(x) = \frac{\cos x^3 - 1 + \ln(1 + x^6)}{x^2(e^{x^2} - 1 - x^2)}$ and $g(x) = \begin{cases} e^{x^2} - e, & x \neq 1 \\ \frac{e^x - e}{5}, & x = 1 \end{cases}$ then find $\lim_{x \rightarrow 0} g(f(x))$

(SPACE FOR ROUGH WORK)



3. If $f_1(x) = \frac{x}{3} + 10$ for all $x \in \mathbb{R}$
 $f_n(x) = f_1(f_{n-1}(x))$; $n \geq 2$
 then the value of $f_n(15)$ is
4. If f and g are two distinct linear functions defined on \mathbb{R} such that they map $[-1, 1]$ onto $[0, 2]$ and
 $h : \mathbb{R} - \{-1, 0, 1\} \rightarrow \mathbb{R}$ defined by $h(x) = \frac{f(x)}{g(x)}$, the largest integer k such that the $|h(h(x)) + h(h(1/x))| > k$
 for all x is
5. Let the sum of all solutions of the equation $(x^{\log_{10} 3})^2 - (3^{\log_{10} x}) - 2 = 0$ be $a^{\log_b c}$ where a, b, c are relatively prime
 natural numbers. If $\lim_{x \rightarrow 1} \frac{x^p - px + p - 1}{(x - 1)^2} = f(p)$ then the value of $f(b)$ is

(SPACE FOR ROUGHWORK)



6. $f(x) = \begin{cases} -x+1 & x \leq 0 \\ -(x-1)^2 & x \geq 1 \end{cases}$

then number of solution of the equation $f(x) - f^{-1}(x) = 0$ is.

7. If $x^2 + x + 1 - |[x]| = 0$ then number of solution. (where $[.]$ denotes the greatest integer function $\leq x$)

8. The period of function $f(x-1) + f(x+1) = \sqrt{3} f(x)$ is

(SPACE FOR ROUGH WORK)



PART - II [PHYSICS]

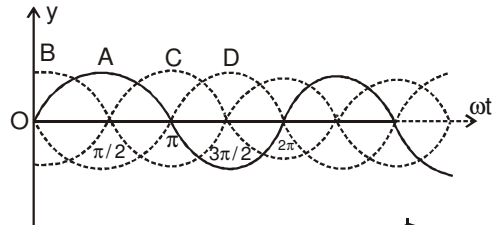
SECTION - (A)

[MULTIPLE CORRECT TYPE]

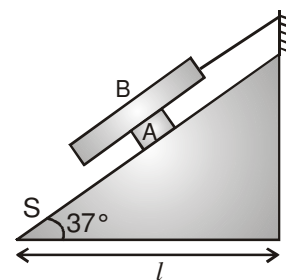
Q.1 to 6 has four choices (A), (B), (C), (D) out of which **ONE OR MORE THAN ONE** is/are correct

1. The figure shows four progressive waves A, B, C & D. It can be concluded from the figure that with respect to wave A :

- (A) the wave C is ahead by a phase angle of $\pi/2$
 (B) the wave C lags behind by a phase angle of $\pi/2$
 (C) the wave B is ahead by the phase angle of $\pi/2$
 (D) the wave D lags behind by a phase angle of π



2. Block A of mass 'm' slides down an inclined plane S of slope angle 37° at constant velocity while the plank B also of mass m rests on the top of A. The plank is attached by a cord to the top of the plane (shown figure). If the coefficient of kinetic friction between surfaces A and B and between S and A is the same. Then Choose the correct statement :



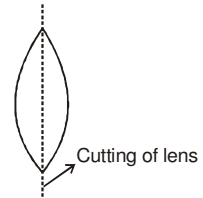
- (A) coefficient of kinetic friction $\mu = \frac{1}{4}$ (B) coefficient of kinetic friction $\mu = \frac{3}{4}$
 (C) Direction of frictional force on A is downwards (D) Direction of frictional force on B is upwards

(SPACE FOR ROUGH WORK)



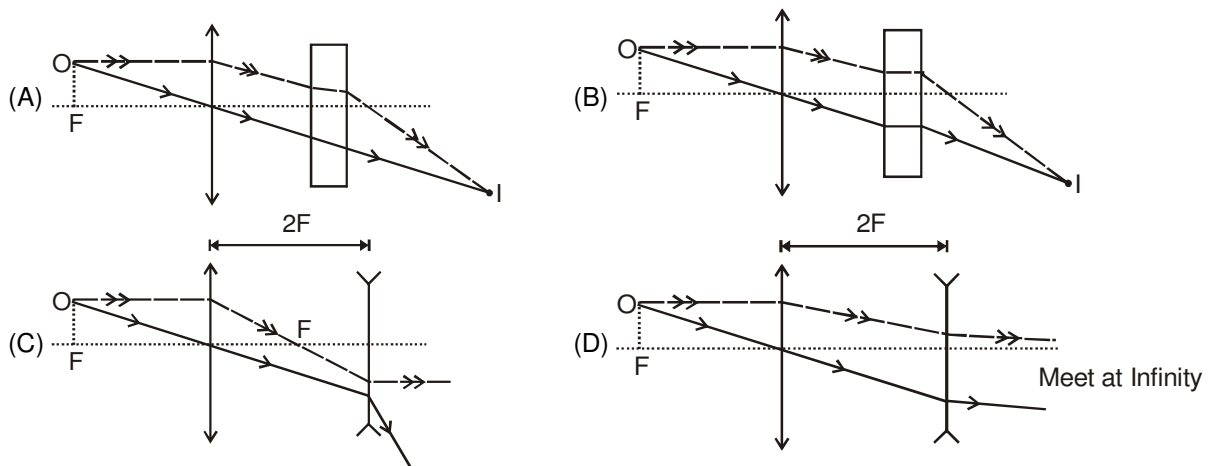
3. After cutting the lens. Which of the following statement is incorrect for each part of lens :

- (A) power decreases (B) power increases
 (C) chromatic aberration decreases (D) chromatic aberration increases



4. Choose incorrect ray diagram [\updownarrow denote converging lens and \Uparrow denote diverging lens]

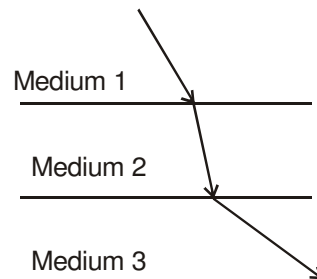
All symbols have their usual meaning and all the rays shown are paraxial. (focal length of each lens is F)



(SPACE FOR ROUGH WORK)



5. In a plane progressive harmonic wave :
- (A) phase difference between displacement and acceleration of particle is zero
 (B) phase difference between displacement and acceleration of particle is π
 (C) phase difference between displacement and velocity of particle is $\pi/2$
 (D) phase difference between velocity and acceleration of particle is $\pi/2$
6. The diagram below shows the path taken by a monochromatic light ray travelling through three media. The symbols v_i , λ_i , and f_i , represent the speed, wavelength, and frequency of the light in Medium i , respectively. Which of the following relationships for the light in the three media is/are true ?



(A) $\lambda_1 < \lambda_3 < \lambda_2$

(B) $v_1 < v_3 < v_2$

(C) $f_1 < f_3 < f_2$

(D) $\lambda_2 < \lambda_1 < \lambda_3$

(SPACE FOR ROUGH WORK)



SECTION - (B)

[MATCH THE COLUMN]

Q.1 is "Match the Column" type. Column - I Constains four (i.e. A,B, C,D) entries and column-II contains five (i.e. P,Q,R,S,T) entries. Entry of column-I are to be matched with **only one entry** of column-II or vice versa.

1. Two particles 'A' and 'B' start SHM at $t = 0$. Their positions as a function of time are given by

$$X_A = A \sin \omega t$$

$$X_B = A \sin (\omega t + \pi/3)$$

Column-I

Column-II

(A) Minimum time when x is same

(P) $\frac{5\pi}{6\omega}$

(B) Minimum time when velocity is same

(Q) $\frac{\pi}{3\omega}$

(C) Minimum time after which $v_A < 0$ and $v_B < 0$

(R) $\frac{\pi}{\omega}$

(D) Minimum time after which $x_A < 0$ and $x_B < 0$

(S) $\frac{\pi}{2\omega}$

(T) None

(SPACE FOR ROUGH WORK)



Q.2 is "Match the Column" type. Column - I Constains four (i.e. A,B, C,D) entries and column-II contains five (i.e. P,Q,R,S,T) entries. Entry of column-I are to be matched with **one or more than one entries** of column-II or vice versa.

2.	Column I	Column II
	(A) If a convergent beam of light passes through a diverging lens ($\mu = 1.5$) from air	(P) may be a convergent beam
	(B) If a divergent beam of light passes through a diverging lens ($\mu = 1.5$) from air	(Q) may be a divergent beam
	(C) If a divergent beam of light passes through a glass slab ($\mu = 1.5$) from air	(R) may be parallel beam
	(D) If a divergent beam of light passes through a glass lens ($\mu = 1.5$) from medium of refractive index ($\mu = 1.6$)	(S) must be a divergent beam
		(T) None

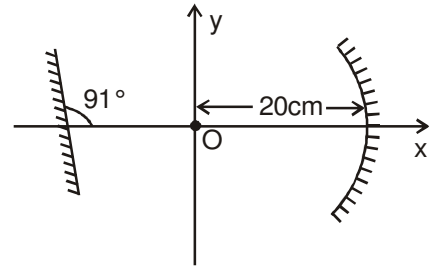
(SPACE FOR ROUGH WORK)



SECTION - (C)
[INTEGER ANSWER TYPE]

Q.1 to 8 are Integer Answer type Questions. (The answer of each of the questions are upto 4 digits)

- A point object O is placed on the principal axis of a convex lens of focal length 10 cm at 12 cm from the lens. When object is fixed and lens is displaced 1 mm away from the object magnitude of displacement of image is x_1 . When the lens is displaced by 1 mm perpendicular to the principal axis keeping object fixed, displacement of image is x_2 in magnitude. Find the value of x_1/x_2 . [Give the answer in closest integer]
- A point object is placed at the centre of curvature of a concave mirror (taken as origin). A plane mirror is also placed at a distance of 10 cm from the object as shown. Consider two reflection first at plane mirror and then second at concave mirror. (x_0, y_0) the coordinate of the image thus formed are. Find $\frac{\pi x_0}{y_0}$
- A small object is placed normal to the axis of a lens. The distance between object and lens is 56 cm. It is observed that the size of image does not change even if the entire system is submerged in water. Find focal length (in cm) of the lens in air. Refractive indices of material of lens is $3/2$ and that of water is $4/3$.

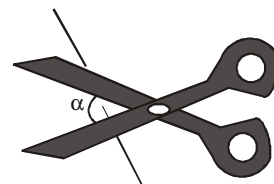


(SPACE FOR ROUGH WORK)

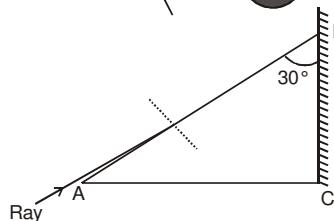


4. We are trying to cut a wire with scissors. Initially the angle between blades is large. It is observed that the wire slides until the angle between the scissors blades becomes α . Gravity is negligible, wire is not fixed.

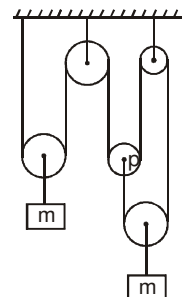
If coefficient of friction between the blades and the wire is $\mu = \frac{1}{\sqrt{3}}$, find α (in degrees).



5. The diagram shows a right angled prism the other surface of which is made perfectly reflecting. The angle $ABC = 30^\circ$ and the refractive index of the prism is $2/\sqrt{3}$. The light ray is incident from air on the inclined face at grazing incidence. What will be the overall deviation of the light ray in anticlockwise direction (in degrees) after it comes back in air ?



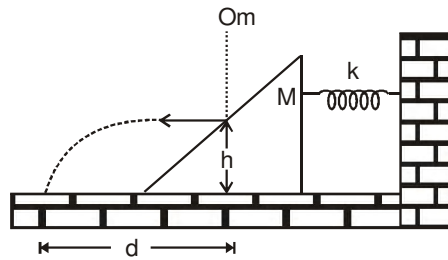
6. All pulleys are massless. The string is light and inextensible. Find acceleration of center of pulley 'p' in m/s^2 .



(SPACE FOR ROUGH WORK)



7. A ball of mass 'm' when dropped from certain height as shown in diagram, strikes a wedge kept on smooth horizontal surface and move horizontally just after impact. If the ball strikes the ground at a distance d from its initial line of fall, then the amplitude of oscillation of wedge after being hit by the ball will be (in cm)
 Here ($m = 1 \text{ kg}$, $k = 400 \text{ N/m}$, $d = 2 \text{ m}$, $M = 20 \text{ kg}$, $h = 1 \text{ m}$, $g = 10 \text{ m/sec}^2$)



8. Velocity of a particle moving along a straight line at any time 't' is given by $V = \cos\left(\frac{\pi}{3}t\right)$. The distance travelled by the particle in the first two seconds is equal to : [Give the answer in closest integer]

(SPACE FOR ROUGH WORK)



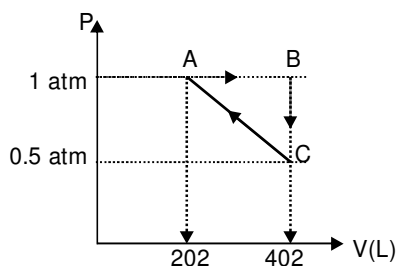
PART - III [CHEMISTRY]

SECTION - (A)

[MULTIPLE CORRECT TYPE]

Q.1 to 6 has four choices (A), (B), (C), (D) out of which **ONE OR MORE THAN ONE** is/are correct

1. On the basis of the following graph (P – V graph), choose the correct statements.



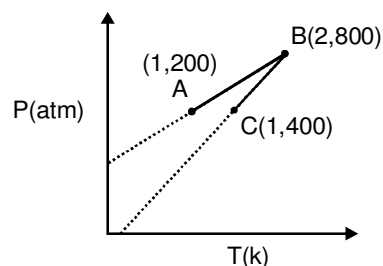
- (A) Total work = – 50 bar-L
 (B) For the over all process $\Delta H > \Delta E$.
 (C) Total work done, $W = q$
 (D) Total work = – 5066.25 J
2. Which of the following are incorrect for an isothermal reversible reaction.
- (A) $\Delta E = 0$ (B) $\Delta H = 0$ (C) $W = \int -PdV$ (D) $W = -q$

(SPACE FOR ROUGH WORK)



3. One mole of an ideal gas is subjected to a reversible process that involves two steps ($A \rightarrow B$ and $B \rightarrow C$). The pressure at A and C is same. Consider the graph and choose correct statements.

- (A) Work done $A \rightarrow B$ is zero
- (B) In path $A \rightarrow B$ work will be done on the gas by the surroundings
- (C) Volume of gas at C = 2 × Volume of gas at A
- (D) Volume of gas at B is 32.8 L



4. Which of the following statement(s) is/are correct about the titration?

- (A) The equivalence point is the stage at which the equivalent amounts of titrand and titrant are present
- (B) The end point is the stage of titration at which the indicator shows the colour change
- (C) At the end point, as shown by the indicator, the amounts of titrant and titrand are exactly equivalent
- (D) None

(SPACE FOR ROUGH WORK)



5. x millimole of KIO_3 react completely with y millimole of KI to give I_2 quantitatively. If z millimole of hypo are required for complete titration against the I_2 produced, then
 (A) $z = 6x$ (B) $6y = 5z$ (C) $5x = y$ (D) $x + y = 2z$
6. Which of the following statement(s) is/are true.
- (A) Acidity order : $\text{OHCH}_2 - \overset{\text{O}}{\parallel}{\text{C}} - \text{OH} < \text{ClCH}_2 - \overset{\text{O}}{\parallel}{\text{C}} - \text{OH} < \text{H} - \overset{\text{O}}{\parallel}{\text{C}} - \text{OH}$
- (B) $-\text{NMe}_3^{\oplus}$ is stronger - I group than $-\text{NH}_3^{\oplus}$
- (C) The compound having minimum carbon atoms which shows structural isomerism is C_4H_{10}
- (D) p-chloro phenol is more acidic than p-fluoro phenol.

(SPACE FOR ROUGH WORK)



SECTION - (B)

[MATCH THE COLUMN]

Q.1 is "Match the Column" type. Column - I Contains four (i.e. A,B, C,D) entries and column-II contains five (i.e. P,Q,R,S,T) entries. Entry of column-I are to be matched with **only one entry** of column-II or vice versa.

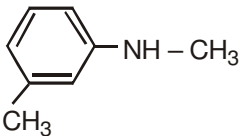
1. Given two mixtures : (I) NaOH and Na₂CO₃ and (II) NaHCO₃ and Na₂CO₃
100 ml of mixture I required w and x ml of 1 M HCl in separate titrations using phenolphthalein and methyl orange indicators while 100 ml of mixture II required y and z ml of same HCl solution in separate titrations using the same indicators.

Column I	Column II
(A) Na ₂ CO ₃ in mixture I	(P) $(2w - x) \times 10^{-2}$
(B) Na ₂ CO ₃ in mixture II	(Q) $(z - 2y) \times 10^{-2}$
(C) NaOH in mixture I	(R) $y \times 10^{-2}$
(D) NaHCO ₃ in mixture II	(S) $(x - w) \times 10^{-2}$
	(T) None

(SPACE FOR ROUGH WORK)



Q.2 is "Match the Column" type. Column - I Contains four (i.e. A,B, C,D) entries and column-II contains five (i.e. P,Q,R,S,T) entries. Entry of column-I are to be matched with **one or more than one entries** of column-II or vice versa.

2.	Column I	Column II
(A)	$\text{CH}_3 - \text{CH} = \text{CH} - \text{NO}_2$	(P) Hyperconjugation effect
(B)	$\text{CH}_2 = \text{CH} - \text{CH} = \text{CH} - \text{Cl}$	(Q) (-) Inductive effect
(C)		(R) (\pm) Resonance effect
(D)	$\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{Cl}$	(S) (+) Inductive effect
		(T) None

(SPACE FOR ROUGHWORK)



SECTION - (C)

[INTEGER ANSWER TYPE]

Q. 1 to 8 are Integer Answer type Questions. (The answer of each of the questions are upto 4 digits)

1. Gaseous benzene reacts with hydrogen gas in the presence of nickel catalyst to gaseous cyclohexane. A mixture of benzene vapour and excess of hydrogen had a pressure of 60 mm Hg in a vessel. After all benzene converted to cyclohexane, the pressure of the gas was 30 mm Hg in the same volume and at the same temperature. What fraction (by volume) of the original mixture was benzene? **[Fill your OMR by multiplying your answer by 12]**
2. A sample containing 0.4775 gm of $(\text{NH}_4)_2\text{C}_2\text{O}_4$ and inert material was dissolved in water and made strongly alkaline with KOH, which converted NH_4^+ to NH_3 . The liberated ammonia was distilled into exactly 50.00 ml of 0.050 M H_2SO_4 . The excess H_2SO_4 was back titrated with 11.3 ml of 0.1214 M NaOH. Calculate percent of $(\text{NH}_4)_2\text{C}_2\text{O}_4$. (Mol. wt. of $(\text{NH}_4)_2\text{C}_2\text{O}_4 = 124$) **[Fill your answer with Integer part Only]**
3. The no. of Canonical structures of tribenzyl cation such that each structure has the charge on ring.
4. 1 mol of a liquid of molar volume 100 mL is kept in an adiabatic container under a pressure of 1 bar. The pressure is steeply increased to 100 bar. Under this constant pressure of 100 bar, the volume of the liquid decreases by 1 mL. Calculate ΔU and ΔH of the process in joule. (1 bar = 10^5 N/m^2)

(SPACE FOR ROUGH WORK)



5. Total no. of amides having molecular formula C_4H_9ON which can form Hydrogen bonds is x and total no. of amides having molecular formula $C_5H_{11}ON$ which can not form Hydrogen bonds is y , then sum of x & y is :
6. When 1 gm equivalent of strong acid reacts with strong base heat released is 13.5 Kcal, when 1 gm equivalent H_2A is completely neutralised against strong base 13 Kcal is released, when 1 gm equivalent $B(OH)_2$ is completely neutralised against strong acid 10 Kcal heat is released. Calculate enthalpy change (in Kcal) when 1 gm mole H_2A is completely neutralised by $B(OH)_2$.
7. Aluminium and Fe_2O_3 is used as fuel to produce energy according to given reaction
$$2Al(s) + Fe_2O_3(s) \rightarrow Al_2O_3(s) + 2Fe(s)$$

Given : $(\Delta_f H^\ominus)_{Al_2O_3} = -100 \text{ kCal/mol}$, $(\Delta_f H^\ominus)_{Fe_2O_3} = -50 \text{ kCal/mol}$
Maximum heat produced (in Kcal) by 1.07 kg of mixture is:
8. A mixture of Ferrous oxide (FeO) and Ferric oxide (Fe_2O_3) when heated in air gain 5% in weight. What is the percentage of FeO in mixture?(molecular wt. of $FeO = 72$, $Fe_2O_3 = 160$)

(SPACE FOR ROUGH WORK)



ROUGH WORK

