FIITJEE COMMON TEST (PHASE - I)

PHYSICS, CHEMISTRY & MATHEMATICS

| CPT1 - 2 | CODE: | SET: A | PAPER - 2 |

Time Allotted: 3 Hours   **Maximum Marks: 201**

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

INSTRUCTIONS

Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

A. General Instructions

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. This question paper contains Three Sections.
3. **Section-I** is Physics, **Section-II** is Chemistry and **Section-III** is Mathematics.
4. Each **Section** is further divided into Two Parts: **Part - A & B**.
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

B. Filling of OMR Sheet

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with **blue / black ball point pen** for each character of your Enrolment No. and write in ink your Name, Test Centre and other details at the designated places.
3. OMR sheet contains alphabets, numerals & special characters for marking answers.

C. Marking Scheme For All Two Parts.

(i) **Part-A (01 - 06)** contains 6 multiple choice questions which have only one correct answer. Each question carries **+3 marks** for correct answer and **–1 mark** for wrong answer.

   Part-A (07 - 09) contains 3 Assertion-Reasoning questions (MCQs) which have only one correct answer. Each question carries **+3 marks** for correct answer and **–1 mark** for wrong answer.

   Part-A (10 - 15) contains 2 Paragraphs. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has only one correct answer and carries **+4 marks** for the correct answer and **–1 mark** for wrong answer.

(ii) **Part-B (01 - 02)** contains 2 Matrix Match Type questions which have statements given in 2 columns. Statements in the first column have to be matched with statements in the second column. There may be one or more than one correct choices. Each question carries **+8 marks** for all correct answer however for each correct row **+2 marks** will be awarded. No marks will be given for any wrong match in any question. There is no negative marking.

Name of the Candidate :_____

Batch :_____ **Date of Examination :**_____

Enrolment Number :_____

USEFUL DATA

PHYSICS		CHEMISTRY		
Acceleration due to gravity	$: g = 10 \text{ m/s}^2$			
Planck constant	$: h = 6.6 \times 10^{-34} J - s$	Gas Constant	$R =$	$8.314 \text{ J } K^{-1} mol^{-1}$
Charge of electron	$: e = 1.6 \times 10^{-19} C$		$=$	$0.0821 \text{ Lit atm } K^{-1} mol^{-1}$
Mass of electron	$: m_e = 9.1 \times 10^{-31} kg$		$=$	$1.987 \approx 2 \text{ Cal } K^{-1} mol^{-1}$
Permittivity of free space	$: \varepsilon_0 = 8.85 \times 10^{-12} C^2 / N - m^2$	Avogadro's Number N_a	$=$	6.023×10^{23}
Density of water	$: \rho_{water} = 10^3 \, kg / m^3$	Planck's constant h	$=$	$6.625 \times 10^{-34} J.s$
Atmospheric pressure	$: Pa = 10^5 \, N / m^2$		$=$	$6.625 \times 10^{-27} erg.s$
Gas constant	$: R = 8.314 \text{ J } K^{-1} \, mol^{-1}$	1 Faraday	$=$	96500 coulomb
		1 calorie	$=$	4.2 joule
		1 amu	$=$	$1.66 \times 10^{-27} kg$
		1 eV	$=$	$1.6 \times 10^{-19} J$

Atomic No:	H = 1, He = 2, Li = 3, Be = 4, B = 5, C = 6, N = 7, O = 8, F = 9, Ne = 10, Na = 11, Mg = 12, Si = 14, Al = 13, P = 15, S = 16, Cl = 17, Ar = 18, K = 19, Ca = 20, Cr = 24, Mn = 25, Fe = 26, Co = 27, Ni = 28, Cu = 29, Zn = 30, As = 33, Br = 35, Ag = 47, Sn = 50, I = 53, Xe = 54, Ba = 56, Pb = 82, U = 92.
Atomic masses:	H = 1, He = 4, Li = 7, Be = 9, B = 11, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Si = 28, Al = 27, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Co= 59, Ni = 58.7, Cu = 63.5, Zn = 65.4, As = 75, Br = 80, Ag = 108, Sn = 118.7, I = 127, Xe = 131, Ba = 137, Pb = 207, U = 238.

FIITJEE Ltd., *FIITJEE Kathauta Chauraha, Vinamra Khand, Gomti Nagar, Lucknow – 226010. Ph: 0522-2724960, 2724961.* www.fiitjeelucknow.com
FIITJEE Ltd., *Near M.G. Convent School, Sector - G, LDA Colony, Kanpur Road, Aashiana, Lucknow - 226012. Ph: 0522-4114644, 4114645.*
FIITJEE Ltd., *Near Four Season House, A-1/3, Sector - C, Aliganj, Lucknow - 226024. Ph: 0522-4976464, 4976465.*

SECTION – I (PHYSICS)
PART – A
(Single Correct Answer Type)
This part contain **6 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. The component of $\vec{A} = 2\hat{i} + 3\hat{j}$ along the vector $\vec{B} = 3\hat{i} + 4\hat{j}$ is
   (A) 3
   (B) 3.6
   (C) 4
   (D) 6

2. Given that $\vec{A} + \vec{B} + \vec{C} = 0$, out of three vectors two are equal in magnitude and the magnitude of third vectors is $\sqrt{2}$ times that of either of two having equal magnitude. Than angle between vector are given by
   (A) 30°, 60°, 90°
   (B) 45°, 135°, 150°
   (C) 90°, 135°, 150°
   (D) 90°, 135° 135°

3. If time taken by the projectile to reach Q is T, than PQ =
   (A) Tv sin θ
   (B) Tv cos θ
   (C) Tv sec θ
   (D) Tv tan θ
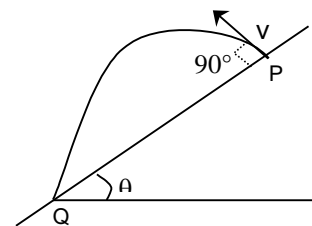
4. If R is the range of a projectile on a horizontal plane and h its maximum height, then maximum horizontal range with the same speed of projection is

   (A) 2h
   (B) $\dfrac{R^2}{8h}$

   (C) $2R + \dfrac{h^2}{8R}$
   (D) $2h + \dfrac{R^2}{8h}$

5. The vertical height of point P above the ground is twice that of Q. A particle is projected downward with a speed of 5 m/s from P and at the same time another particle is projected upward with the same speed from Q. Both particles reach the ground simultaneously then.
   (A) PQ = 30m
   (B) PQ = 60m
   (C) time of flight of the stones =4s
   (D) time of flight of the stones = 1/4s

6. A uniform rope of length l lies on a table. If the co-efficient of friction is μ, then the maximum length l_1 of the part of this rope which can over hang from the edge of the table without sliding down is
   (A) $\dfrac{\mu l}{\mu + 1}$
   (B) $\dfrac{\mu l}{\mu - 1}$
   (C) $\dfrac{l}{\mu + 1}$
   (D) $\dfrac{\mu + 1}{l}$

PART – A
(Assertion Reason Type)
This part contains **3 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

7. Assertion: The apparent weight of a person standing on a lift, which moves upwards with uniform acceleration, is always higher than his true weight.
   Reason: With respect to an observer on earth, Pseudo force increases the apparent weight of person on lift.
   (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
   (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
   (C) If **assertion** is true but **reason** is false.

(D)   If **assertion** is false but **reason** is true.

8.   Assertion: A horizontal external force (F) is acting on the body in state of Rest, for this case
                            μ_s = F/N, N is normal reaction due to surface on block.
        Reason: If a net horizontal external force (F) is acting on a body & body is not moving, it means
                            there is friction between body & the surface on which body is kept
    (A)   If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
    (B)   If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
   (C)   If **assertion** is true but **reason** is false.
    (D)   If **assertion** is false but **reason** is true.

9.   Assertion: Earth is a non-inertial frame of reference
        Reason: Earth Rotates about its own axis as well as revolves around Sun
    (A)   If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
    (B)   If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
    (C)   If **assertion** is true but **reason** is false.
    (D)   If **assertion** is false but **reason** is true.

PART – A
(Paragraph Type)

This part contains **6 multiple choice questions** relating to two paragraphs with **three questions on each paragraph**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions Nos. 10 to 12

A particle is projected vertically with velocity v_0 wind is blowing and is providing a constant horizontal acceleration a_0. There is a vertical wall at some distance from point of projection. If particle strikes the vertical wall perpendicularly then calculate,
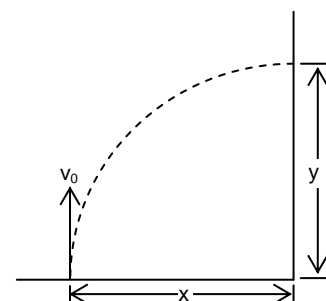
10.   The time taken by the particle to hit the wall is
    (A) v_0 / g (B) $2v_0 / g$
    (C) $3v_0 / g$ (D) $v_0 / 2g$

11.   Horizontal component of velocity with which particle strikes the vertical wall is

    (A) $\dfrac{a_0 v_0}{g}$ (B) $\dfrac{2a_0 v_0}{g}$

    (C) $\dfrac{3a_0 v_0}{g}$ (D) $\dfrac{a_0 v_0}{2g}$

12.   Distance x is given by

    (A) $\dfrac{v_0{}^2}{2g}$ (B) $\dfrac{v_0{}^2}{g}$

    (C) $\dfrac{a_0 v_0{}^2}{2g^2}$ (D) $\dfrac{a_0 v_0{}^2}{g}$

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Paragraph for Questions Nos. 13 to 15

Two particles A & B are projected at same instant shown in figure. If they collide at point P(x, y), then answer following parts.
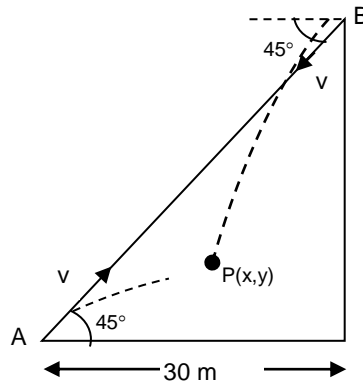
13. Two particles A & B collide after time t then, t is equal to

(A) $\dfrac{30}{v}$ sec

(B) $\dfrac{30\sqrt{2}}{v}$ sec

(C) $\dfrac{50\sqrt{2}}{v}$ sec

(D) $\dfrac{30}{v\sqrt{2}}$ sec

14. Coordinates of P are (taking A is origin)

(A) $\left[15, \dfrac{-15}{v^2}\left(v^2 - 15g\right)\right]$

(B) $\left[15, \dfrac{15}{v^2}\left(v^2 - 15g\right)\right]$

(C) $\left[-15, \dfrac{15}{v^2}\left(v^2 - 15g\right)\right]$

(D) $\left[-15, \dfrac{15}{v^2}\left(v^2 + 15g\right)\right]$

15. Path of projectile B as observed by A is
(A) Parabola
(B) Circle
(C) Straight line
(D) None of these

PART – B
(Matrix Match Type)
This part contains **2 questions**. The question has statements given in **Column I** and **Column II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column.

1. A particle is moving according to displacement – time relation $x = 3t^2 - \dfrac{t^3}{2}$ (where *x* is in metres and *t* is in seconds). Match the condition of Column I with interval of Column II.

Column I		Column II	
(A)	Velocity & acceleration will be in same direction	(p)	At *t* = 0 &*t* = 6 sec
(B)	Particle will be at origin	(q)	0 <*t*< 2 &*t*> 4 sec
(C)	Particle will retard	(r)	At *t* = 0 &*t* = 4 sec
(D)	Velocity is zero	(s)	2 <*t*< 4

2.   A block of mass m is kept on a fixed wedge of angle θ.
       Coefficient of friction between block & wedge is μ.
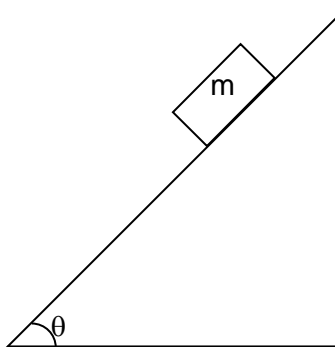
| Column – I (Stage)		Column – II (Frictional Force)	
(A)	Block is at rest ($\theta < \tan^{-1}\mu$)	(p)	$\mu\ mg \cos\theta$
(B)	Block is gently kept at rest on wedge ($\theta > \tan^{-1}\mu$) instantaneously	(q)	$mg \sin\theta$
(C)	Block is moving with constant velocity down the plane	(r)	$< \mu\ mg \cos\theta$
(D)	If $\theta = 0°$	(s)	Zero

SECTION – II (CHEMISTRY)

PART – A
(Single Correct Answer Type)

This part contain **6 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. A gas column is trapped between closed end of a tube and a mercury column of length (h). When this tube is placed with its open end upwards the length of gas column is $\left(l_1\right)$, the length of gas column becomes $\left(l_2\right)$ when open end of tube is held downwards (as shown in figure). Find atmospheric pressure in terms of height of Hg column. (Assume temperature remains constant)
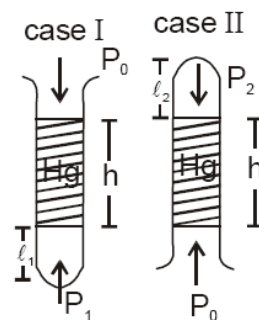
    (A) $\dfrac{h\left(l_1+l_2\right)}{\left(l_2-l_1\right)}$

    (B) $\dfrac{h\left(l_2-l_1\right)}{\left(l_1+l_2\right)}$

    (C) $\dfrac{\left(l_1+l_2\right)}{h\left(l_2-l_1\right)}$

    (D) $\left(h_1l_1+h_2l_2\right)$

2. The ionization energy of hydrogen atom (in the ground state) is x kJ. The energy required for an electron to jump from 2nd orbit to the 3rd orbit will be
    (A) x/6
    (B) 5x
    (C) 7.2x
    (D) 5x/36

3. 10 grams of a sample of Fe_3O_4 is used to oxidize KI in acid solution to I_2. If the sample, by weight, is 90% pure with 10% of inert impurity, how many grams of I_2 will be produced? (Atomic weight of Fe = 56, I = 127)
    (A) 5.987
    (B) 8.265
    (C) 9.853
    (D) 7.358

4. If each orbital can hold a maximum of three electrons, the number of elements in 9th period of periodic table (long from) are.
    (A) 48
    (B) 162
    (C) 50
    (D) 75

5. The molecular shapes of SF_4, SiF_4 and XeF_4 are:
    (A) the same, with 2, 0 and 1 lone pair of electrons respectively
    (B) the same, with 1, 1 and 1 lone pair of electrons respectively
    (C) different with 0, 1 and 2 lone pair of electrons respectively
    (D) different with 1, 0 and 2 lone pair of electrons respectively

6. When a substance A reacts with water, it produces a combustible gas B and a solution of substance C in water. D reacts with this solution of C and produces the same gas B on warming. D can also produce gas B on reaction with dilute H_2SO_4. A imparts a deep golden yellow colour to smokeless flame. A, B, C and D respectively are:
    (A) Na, H_2, NaOH, Zn
    (B) K, H_2, KOH, Al
    (C) Ca, H_2, Ca(OH)$_2$, Sn
    (D) CaC_2, C_2H_2, Ca(OH)$_2$, Fe

PART – A
(Assertion Reason Type)

This part contains **3 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

7. Assertion: Electron affinity of oxygen is less than that of fluorine but greater than that of nitrogen.
    Reason: Ionisation potential is as follows: N > O > F
    (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
    (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
    (C) If **assertion** is true but **reason** is false.
    (D) If **assertion** is false but **reason** is true.

8.   Assertion: The value of vander Waal's constant `a' is larger for ammonia than for nitrogen.
     Reason: Hydrogen bonding is present in ammonia.
     (A)   If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
     (B)   If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
     (C)   If **assertion** is true but **reason** is false.
     (D)   If **assertion** is false but **reason** is true.

9.   Assertion: SF_6 exists but SH_6 does not.

     Reason: $d\pi - p\pi$ bonding cannot take place in SH_6.
     (A)   If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
     (B)   If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
     (C)   If **assertion** is true but **reason** is false.
     (D)   If **assertion** is false but **reason** is true.

PART – A
(Paragraph Type)
This part contains **6 multiple choice questions** relating to two paragraphs with **three questions on each paragraph**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions Nos. 10 to 12

There are three cylinders of identical volume. A mixture of gases containing N_2, NO and NO_2 were taken in the first cylinder at 12 atm and at a certain temperature. After treating the mixture with water, which absorbs NO_2 completely, the remaining gases were transferred to the second cylinder, in which the pressure was 10 atm. The gases in the second cylinder were treated with $FeSO_4$ solution, which absorbed NO completely. The remaining gas was transferred to the third cylinder, in which the pressure was 4 atm. All the operations were carried out at constant temperature.

10.   The partial pressure of which of the above gases is maximum?
      (A) NO_2 (B) NO
      (C) N_2 (D) Unpredictable

11.   What will be the ratio of rates of effusion of the gases from the second cylinder if a small hole is made on the cylinder and the gases are allowed to effuse into vacuum?
      (A) 0.43   (B) 0.68
      (C) 1.23   (D) 0.28

12.   What is the molecular mass of the mixture of gases in the first cylinder?
      (A) 29   (B) 32
      (C) 27   (D) 36

Paragraph for Questions Nos. 13 to 15

Different kind of molecules are available in chemistry, like molecules having single central atom, molecules having more than one central atom, molecules having odd number of electrons and even if some molecules do not exist with theoretical support.

13.   The reason for non-existence of which molecule is not the same with the molecules in other options?
      (A) XeH_6 (B) HFO_4
      (C) SH_6 (D) IH_7

14.   Which of the following statements is incorrect?
      (A) The free electron of ClO_3 molecule is not present in the d-orbital of Cl atom
      (B) The hybridization of central atom of Cl_2CO is sp^2
      (C) In PCl_3F_2 axial bonds are longer than eq. bonds

      (D) The hybridization of $\overset{+}{N}O_2$ is sp and it is linear in shape

15.   The BF_3 is a planar molecule where as NF_3 is pyramidal because
      (A) B-F bond is more polar than N-F bond.

(B) Boron atom is bigger than nitrogen atom.
(C) Nitrogen is more electronegative than boron.
(D) BF_3 has no lone pair but NF_3 has a lone pair of electrons.

PART – B
(Matrix Match Type)
This part contains **2 questions**. The question has statements given in **Column I** and **Column II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column.

1.   Match the following:

Column I (Alkali metal)		Column II	
(A)	Na	(p)	Generally forms super oxide
(B)	Cs	(q)	Shows golden yellow flame in Bunsen burner
(C)	K	(r)	Reacts with water to form H_2
(D)	Li	(s)	Shows diagonal relationship
		(t)	Forms basic oxide

2.   Match the compounds mentioned in **Column – I** with their properties mentioned in **Column – II**

Column-I		Column-II	
(A)	SO_3^{2-}	(p)	Can further increase covalency by using d-orbitals
(B)	PO_4^{3-}	(q)	Central atom undergoes sp^3-hybridisation
(C)	CO_3^{2-}	(r)	Central atom follows octet rule if the double bonds are replaced by dative bonds
(D)	ClO_3^-	(s)	Possess triangular planar shape.
		(t)	Has distorted octahedral or pyramidal shape.

SECTION – III (MATHEMATICS)
PART – A
(Single Correct Answer Type)
This part contain **6 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. The equation of image of pair of lines $y = |x - 1|$ which respect to y-axis is:

   (A) $x^2 - y^2 - 2x + 1 = 0$ (B) $x^2 - y^2 - 4x + 4 = 0$

   (C) $4x^2 - 4x - y^2 + 1 = 0$ (D) $x^2 - y^2 + 2x + 1 = 0$

2. If $\log_k x \log_5 k = \log_x 5, k \neq 1, k > 0,$ then sum of all values of x is:

   (A) 5   (B) $\dfrac{24}{5}$

   (C) $\dfrac{26}{5}$ (D) $\dfrac{37}{5}$

3. The line 2x − y + 1 = 0 is tangent to the circle at the point (2, 5) and the centre of the circles lies on x − 2y = 4. The radius of the circle is:

   (A) $3\sqrt{5}$ (B) $5\sqrt{3}$

   (C) $2\sqrt{5}$ (D) $5\sqrt{2}$

4. If $y = \sqrt{\dfrac{1-x}{1+x}}$, then $(1 - x^2)\dfrac{dy}{dx}$ is equal to

   (A) y^2 (B) $\dfrac{1}{y}$

   (C) $-y$ (D) $\dfrac{-y}{x}$

5. $\int \dfrac{\ln(\tan x)}{\sin x \cos x} dx$ is equal to

   (A) $\dfrac{1}{2}\ln(\tan x) + c$ (B) $\dfrac{1}{2}\ln\left(\tan^2 x\right) + c$

   (C) $\dfrac{1}{2}\left(\ln\left(\tan x\right)\right)^2 + c$ (D) None of these

6. $\displaystyle\int_{\pi/4}^{3\pi/4} (1 + \cos x)\, dx$ is equal to

   (A) $\dfrac{\pi}{2}$ (B) $\dfrac{3\pi}{4}$

   (C) $\dfrac{\pi}{4}$ (D) π

PART – A
(Assertion Reason Type)
This part contains **3 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

7. **Assertion:** $\log_{1/5} \dfrac{4x + 6}{x} \geq 0$ has no solution for $x \in \left(-\dfrac{3}{2}, -1\right)$

Reason: $2^{(y-x)}.(x+y) = 1, (x+y)^{x-y} = 2$ has only one pair of solutions.

(A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
(B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
(C) If **assertion** is true but **reason** is false.
(D) If **assertion** is false but **reason** is true.

8. **Assertion:** The domain of the relation $f(x) = \sqrt{\log_2 \sin x}$ is $(4n+1)\dfrac{\pi}{2}, n \in N$.

   Reason: Expression under even root should be ≥ 0 and for $\log_a b$, $b > 0$.

   (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
   (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
   (C) If **assertion** is true but **reason** is false.
   (D) If **assertion** is false but **reason** is true.

9. **Assertion:** $\cos\dfrac{\pi}{2}\cos\dfrac{2\pi}{7}\cos\dfrac{4\pi}{7} = -\dfrac{1}{8}$

   Reason: $\cos\theta\cos 2\theta\cos 2^2\theta.......... \cos 2^{n-1}\theta = \dfrac{-1}{2^n}$, if $\theta = \dfrac{\pi}{2^n - 1}$

   (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.
   (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.
   (C) If **assertion** is true but **reason** is false.
   (D) If **assertion** is false but **reason** is true.

PART – A
(Paragraph Type)

This part contains **6 multiple choice questions** relating to two paragraphs with **three questions on each paragraph**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions Nos. 10 to 12

A ball is moving around the circle $14x^2 + 14y^2 + 216x - 69y + 432 = 0$ in clockwise direction leaves it tangentially at the point $P(-3, 6)$ after getting reflected from a straight line L = 0 it passes through the centre of the circle. The perpendicular distance of this straight line L = 0 from the point P is $\dfrac{11}{13}\sqrt{130}$. You can assume that the angle of incidence is equal to the angle of reflection.

10. The equation of tangent to the circle at P is
    (A) 2x – y + 12 = 0   (B) 4x + 3y – 6 = 0
    (C) 3x – 2y + 21 = 0   (D) 2x + 5y – 24 = 0

11. Radius of the circle is
    (A) $\dfrac{165}{14}$ (B) $\dfrac{165}{46}$
    (C) $\dfrac{165}{28}$ (D) None of these

12. If angle between the tangent at P and the line through 'P' perpendicular to the line L = 0 is θ, then tan θ is
    (A) 2/11   (B) 3/11
    (C) 4/11   (D) None of these

Paragraph for Questions Nos. 13 to 15

Consider a $\triangle ABC$ whose sides AB, BC and CA are represented by the straight lines 2x + y = 0, x + py = q and x – y = 3 respectively. The point P is (2, 3).

13. If P is the centroid, then (p + q) equals
    (A) 47   (B) 50
    (C) 65   (D) 74

14. If P is the orthocenter, then (p + q) equals
    (A) 47   (B) 50
    (C) 65   (D) 74

15. If P is the circumcenter, then (p + q) equals
    (A) 47   (B) 50
    (C) 65   (D) 74

PART – B
(Matrix Match Type)

This part contains **2 questions**. The question has statements given in **Column I** and **Column II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column.

1. Match the following:

	Column I		Column II
(A)	If $\theta + \phi = \dfrac{\pi}{2}$, where θ and ϕ are positive, then $(\sin\theta + \sin\phi)\sin\left(\dfrac{\pi}{4}\right)$ is always less than	(p)	1
(B)	If $\sin\theta - \sin\phi = a$ and $\cos\theta + \cos\phi = b$, then $a^2 + b^2$ cannot exceed	(q)	6
(C)	If $3\sin\theta + 5\cos\theta = 5, (\theta \neq 0)$ then the value of $5\sin\theta - 3\cos\theta$ is	(r)	3
(D)	If $2\cos x + \sin x = 1$, then the value of $7\cos x + 6\sin x$ is equal to	(s)	4

2. Match the following:

	Column I		Column II
(A)	The sides BC, CA and AB of a triangle ABC are x + 2y = 1, 3x + y + 5 = 0 and x – y + 2 = 0. The equation of the altitude through B is	(p)	2x – y = 1
(B)	The image of the line x – 2y = 1 in the line x + y = 0	(q)	2x + y = 3
(C)	A right angled triangle ACB with sides AB, BC, CA in ratio 5 : 4 : 3 moves such that A and B always lie on the positive X and y axes respectively. The locus of C is	(r)	3x – 4y = 0
(D)	A (1, 2) and B (-1, 5) are two vertices of a triangle ABC whose third vertex C lies on the line 2x + y = 2. The locus of the centroid of the triangle is	(s)	4x + 3y = 4
		(t)	X – 3y + 4 = 0

FIITJEE Ltd., *FIITJEE Kathauta Chauraha, Vinamra Khand, Gomti Nagar, Lucknow – 226010. Ph: 0522-2724960, 2724961.* www.fiitjeelucknow.com
FIITJEE Ltd., *Near M.G. Convent School, Sector - G, LDA Colony, Kanpur Road, Aashiana, Lucknow - 226012. Ph: 0522-4114644, 4114645.*
FIITJEE Ltd., *Near Four Season House, A-1/3, Sector - C, Aliganj, Lucknow - 226024. Ph: 0522-4976464, 4976465.*

FIITJEE COMMON TEST

TWO YEAR CRP (CTY - 1820)

BATCH: B - LOT

PCM (PAPER – II)   PHASE - I

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ANSWER KEYS [SET – A]

Q. No.	Section - I (Physics) Answer Key	Concept Code	Q. No.	Section - II (Chemistry) Answer Key	Concept Code	Q. No.	Section - III (Maths) Answer Key	Concept Code
Part - A			Part - A			Part - A		
1	B	P110205	1	A	C111201	1	D	M113333
2	D	P110201	2	D	C110103	2	C	M112403
3	D	P110314	3	C	C111112	3	A	M113339
4	D	P110310	4	D	C110108	4	C	M112407
5	A	P110303	5	D	C110306	5	C	M112408
6	A	P110410	6	A	C110802	6	A	M113808
7	C	P110408	7	C	C110704	7	C	M110202
8	D	P110412	8	A	C113506	8	A	M112205
9	A	P110401	9	B	C110306	9	A	M113303
10	A	P110310	10	B	C111207	10	B	M113339
11	A	P110310	11	B	C111208	11	C	M113335
12	C	P110310	12	B	C111207	12	B	M113320
13	D	P110315	13	B	C110306	13	D	M113303
14	B	P110315	14	C	C113601	14	B	M113306
15	C	P110315	15	D	C110305	15	A	M113305
Part - B			Part - B			Part - B		
1	(A) - (q) (B) - (p) (C) - (s) (D) - (r)	P110306	1	(A) - (q, r, t) (B) - (p, r, t) (C) - (p, r, t) (D) - (r, s, t)	C110803 C110801	1	(A) - (p, q, r, s) (B) - (q, s) (C) - (r) (D) - (q)	M113521 M113508 M113502
2	(A) - (q, r) (B) - (p) (C) - (p, q) (D) - (s)	P110410	2	(A) - (p, q, r, t) (B) - (q, r) (C) - (s) (D) - (p, q, r, t)	C113601 C113602 C113605	2	(A) - (t) (B) - (p) (C) - (r) (D) - (q)	M113322 M113308 M113323 M113324