

PHYSICS, CHEMISTRY & MATHEMATICS**QP CODE:****Common Test-7****Time Allotted: 3 Hours****Maximum Marks: 180**

- 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. All the section can be filled in **PART-A & B** of OMR.
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 (01-04)** – Contains Four (04) multiple choice questions which have ONLY ONE CORRECT answer. Each question carries **+3 marks** for correct answer and **-1 marks** for wrong answer.
- (ii) **PART-A (05–07)** contains (3) Multiple Choice Questions which have **One or More Than One Correct** answer.
Full Marks: +4 If only the bubble(s) corresponding to all the correct option(s) is (are) darkened.
Partial Marks: +1 For darkening a bubble corresponding to **each correct option**, provided NO incorrect option is darkened.
Zero Marks: 0 If none of the bubbles is darkened.
Negative Marks: -1 in all other cases.
For example, if (A), (C) and (D) are all the correct options for a question, darkening all these three will result in **+4 marks**; darkening only (A) and (D) will result in **+2 marks**; and darkening (A) and (B) will result in **-1 marks**, as a wrong option is also darkened.
- (iii) **Part-A (08-11)** – This section contains Four (04) Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question. Each question carries **+3 Marks** for correct answer and **-1 marks** for wrong answer.
- (iii) **Part-B (01-06)** This section contains **SIX (06)** questions. The answer to each question is a **NON-NEGATIVE INTEGER**. For each question, enter the correct integer corresponding to the answer. Each question carries **+4 marks** for correct answer. **There is no negative marking.**

Name of the Candidate: _____

Batch: _____ Date of Examination: _____

Enrolment Number: _____

BATCH – NWCMSW425A1

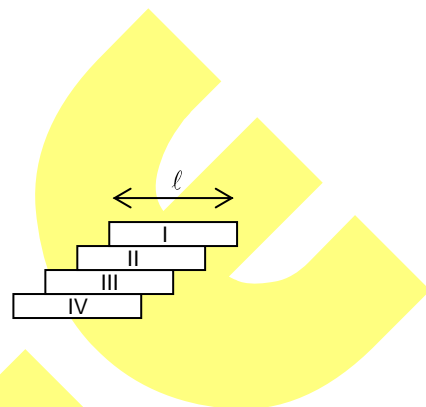
(One or More Than One Options Correct Type)

This section contains **3 multiple choice questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE or MORE THAN ONE is correct**.

5. A cannon shell is fired to hit a target at a horizontal distance R , however it breaks into two equal parts at its highest point. One part returns to the cannon. The other part
 (A) will fall at a distance R beyond target
 (B) will fall at a distance $3R$ beyond target
 (C) will hit the target
 (D) have nine times kinetic energy of first just after explosion.

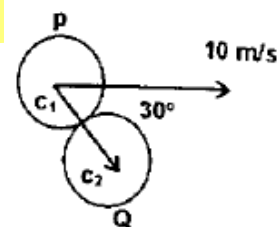
6. Four bricks each of length l are put on the top of one another in such a way that part of each extends beyond the one beneath. The largest equilibrium extension are

- (A) top brick over hanging the one below by $\frac{l}{2}$
 (B) second brick from top over hanging the one below $\frac{l}{4}$
 (C) third brick from top overhanging by bottom one by $\frac{l}{6}$
 (D) the total overhanging length on the edge of the bottom brick is $\frac{11}{12}l$



7. A ball P collides elastically with another identical ball Q at rest with velocity 10 m/s at an angle of 30° from the line joining their centres c_1 and c_2 . Select the correct alternative(s)

- (A) Velocity of ball P after collision is 5 m/s
 (B) Velocity of ball Q after collision is $5\sqrt{3} \text{ m/s}$
 (C) both the ball move at right angle after collision
 (D) kinetic energy will not be conserved since collision is not a head-on collision.

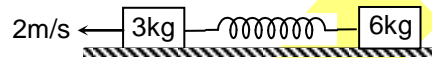


Space For Rough Work

(Matching List Sets)

This section contains **FOUR (04)** Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question.

8. Two blocks of masses 3 kg and 6 kg are connected by an ideal spring and are placed on a frictionless horizontal surface. The 3 kg block is imparted a speed of 2 m/s towards left. (consider left as positive direction)

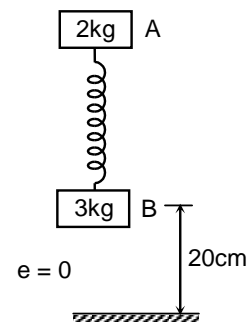


List-I		List-II	
(P)	When the velocity of 3 kg block is $\frac{2}{3}$ m/s, towards left.	(1)	Velocity of centre of mass is $\frac{2}{3}$ m/s
(Q)	When the speed of 3 kg block is $\frac{2}{3}$ m/s.	(2)	Deformation of the spring may be zero.
(R)	When the speed of 3 kg block is minimum.	(3)	Deformation of the spring may be maximum
(S)	When the speed of 6 kg block is maximum.	(4)	Both the blocks are at rest with respect to each other.

The correct option is:

- (A) P \rightarrow 1,3,4 ; Q \rightarrow 1,2,3 ; R \rightarrow 2 ; S \rightarrow 1,2
 (B) P \rightarrow 1,3,4 ; Q \rightarrow 1,2,3,4 ; R \rightarrow 1 ; S \rightarrow 1,2
 (C) P \rightarrow 1,2,4 ; Q \rightarrow 2,3,4 ; R \rightarrow 4 ; S \rightarrow 1,2,3
 (D) P \rightarrow 2,3,4 ; Q \rightarrow 1,4 ; R \rightarrow 1,2 ; S \rightarrow 3,4

9. A massless spring constant $k = 100$ N/m is connected to two blocks A and B of masses 2 kg and 3 kg respectively held at rest with the spring relaxed at height 20 cm above the ground. The system is released and after hitting the ground block B comes to rest. ($g = 10$ m/s²)



List-I		List-II	
(P)	Loss of energy during collision	(1)	Zero
(Q)	Spring energy when block A is in equilibrium	(2)	6 J
(R)	Work done by gravitational force on A from initial to till block A comes in equilibrium	(3)	8 J
(S)	Spring energy at the time of collision of B with surface	(4)	2 J
		(5)	-8 J

The correct option is:

- (A) P \rightarrow 2 ; Q \rightarrow 4 ; R \rightarrow 1 ; S \rightarrow 3
 (B) P \rightarrow 1 ; Q \rightarrow 2 ; R \rightarrow 3 ; S \rightarrow 4
 (C) P \rightarrow 4 ; Q \rightarrow 3 ; R \rightarrow 2 ; S \rightarrow 1
 (D) P \rightarrow 2 ; Q \rightarrow 4 ; R \rightarrow 3 ; S \rightarrow 1

Space For Rough Work

10. Let h_0 be the initial height of ball with respect to the earth. The coefficient of restitution is e .

List-I		List-II	
(P)	Total distance travelled by the ball before coming to rest.	(1)	$e^{2n}h_0$
(Q)	Height attained after n impacts	(2)	$h_0 \left(\frac{1+e^2}{1-e^2} \right)$
(R)	Average force exerted by ball	(3)	$P \left(\frac{1+e}{1-e} \right)$
(S)	Total momentum transferred to the earth	(4)	mg

The correct option is:

- (A) $P \rightarrow 2$; $Q \rightarrow 1$; $R \rightarrow 4$; $S \rightarrow 3$ (B) $P \rightarrow 4$; $Q \rightarrow 3$; $R \rightarrow 2$; $S \rightarrow 1$
 (C) $P \rightarrow 2$; $Q \rightarrow 1$; $R \rightarrow 3$; $S \rightarrow 4$ (D) $P \rightarrow 1$; $Q \rightarrow 2$; $R \rightarrow 3$; $S \rightarrow 4$

- 11.

List-I		List-II	
(P)	Perfectly elastic and head on collision between two objects	(1)	$e = 1$
(Q)	Perfectly elastic and oblique collision between two objects	(2)	$e = 0$
(R)	Inelastic and head on collision between two objects	(3)	$0 \leq e < 1$
(S)	Perfectly inelastic and head on collision between two objects	(4)	Momentum of the system of colliding objects is conserved

The correct option is:

- (A) $P \rightarrow 2,4$; $Q \rightarrow 3$; $R \rightarrow 3,4$; $S \rightarrow 4$ (B) $P \rightarrow 1,4$; $Q \rightarrow 1,4$; $R \rightarrow 3,4$; $S \rightarrow 4$
 (C) $P \rightarrow 1,2$; $Q \rightarrow 4$; $R \rightarrow 3,4$; $S \rightarrow 2$ (D) $P \rightarrow 1,4$; $Q \rightarrow 2,4$; $R \rightarrow 3,4$; $S \rightarrow 2$

(PART – B)

(Non – Negative Integer)

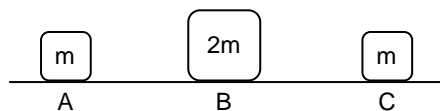
1. Two blocks of masses $m_1 = 2$ kg and $m_2 = 5$ kg are moving in the same direction along a frictionless surface with speeds 10 m/s and 3 m/s respectively, m_2 being ahead of m_1 . An ideal spring with $k = 1120$ N/m is attached to the back side of m_2 . The maximum compression of the spring when the blocks collide is



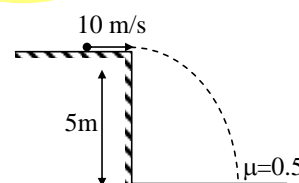
$\left(\frac{1}{n} \right)$ metre. Then the value of 'n' is

Space For Rough Work

2. Three objects A, B and C are kept in a straight line on a frictionless horizontal surface. These have masses m , $2m$ and m , respectively. The object A moves towards B with a speed 9 ms^{-1} and makes an elastic collision with it. Thereafter, B makes completely inelastic collision with C. All motions occur on the same straight line. Find the final speed (in ms^{-1}) of the object C.



3. A sphere of mass m collides elastically with another stationary sphere of mass $m/2$ obliquely. Both the spheres are smooth and there are no external forces acting on them. Maximum angle through which sphere of mass m can be deflected wrt its initial direction of motion is $\frac{\pi}{x}$. Value of x is
4. A ball moving with velocity \hat{i} collides with stationary frictionless wall and returns with a velocity $\frac{\hat{j}}{2}$. If coefficient of restitution for this collision is $\frac{1}{N}$. Find the value of 'N'.
5. The mass per unit length of a rod varies as $m = \left(\frac{M_0}{L}\right)x$ where M_0 is a constant and x is the distance of any point on rod measured from one end. Centre of mass of the rod from the given end is at a distance $\frac{KL}{3}$ on the rod. Find the value of K .
6. A small ball moving with a velocity 10 m/s , horizontally (as shown in figure) strikes a rough horizontal surface having $\mu = 0.5$. If the coefficient of restitution is $e = 0.4$. Horizontal component of velocity of ball in m/s after 1st impact will be ($g = 10 \text{ m/s}^2$)



Space For Rough Work

SECTION – II: CHEMISTRY**(PART – A)****(Single Correct Answer Type)**

This section contains **4 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

- The radius of the first orbit of hydrogen atom is a_0 . What is the difference between the radii of the fourth and third orbits of hydrogen atom?
(A) $5a_0$ (B) $7a_0$
(C) a_0 (D) $10a_0$
- Addition of which substance to an aqueous solution of HCl will produce maximum quantity of heat?
(A) NaCl (B) H_2SO_4
(C) NaOH (D) HNO_3
- Which of the following state function does not change if a thermodynamic system is subjected to isothermal change?
(A) Entropy (B) Internal energy
(C) Gibb's free energy (D) Helmholtz energy
- How much mL of NaOH solution of concentration 0.4 mol L^{-1} is required to neutralize 200 mL of 0.4 M solution of HCl?
(A) 200 (B) 400
(C) 100 (D) 600

(One or More Than One Options Correct Type)

This section contains **3 multiple choice questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE or MORE THAN ONE is correct**.

- The correct statement(s) for a vacant $4p_z$ orbital is/are
(A) $n = 4$ (B) $\ell = 1$
(C) $m = 0$ (D) $s = +\frac{1}{2}$

Space For Rough Work

6. In which of the following thermodynamic process(es) the PV-work is zero?
 (A) Isochoric process (B) Isothermal expansion of a gas into vacuum
 (C) Adiabatic reversible compression (D) Isobaric reversible expansion
7. 400 mL of 0.1 M acidified KMnO_4 solution was added to one litre solution containing 0.2 mole Fe^{2+} ions.
 $\text{MnO}_4^- + \text{Fe}^{2+} + \text{H}^+ \longrightarrow \text{Mn}^{2+} + \text{Fe}^{3+} + \text{H}_2\text{O}$
 Choose the correct observations
 (A) the pink colour of KMnO_4 becomes colourless
 (B) Fe^{2+} is oxidized
 (C) Fe^{3+} is reduced
 (D) the colour of the solution after reaction becomes green

(Matching List Sets)

This section contains **FOUR (04)** Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question.

8. Match the following:

List – I (Position of the electrons in atoms)		List– II (Quantum numbers associated with the electrons)	
(P)	Outermost orbit electron of potassium(Z = 19)	(1)	$n = 4$
(Q)	Highest energetic electron of aluminum(Z = 13)	(2)	$n = 3$
(R)	24 th electron of chromium(Z = 24)	(3)	$\ell = 0$
(S)	The lowest energetic electron of sodium(Z = 11)	(4)	$\ell = 1$
		(5)	$\ell = 2$

- (A) P → 1, 4; Q → 1, 3; R → 2, 4; S → 3 (B) P → 1, 3; Q → 3, 4; R → 1, 3; S → 2, 3
 (C) P → 1, 3; Q → 2, 4; R → 2, 5; S → 3 (D) P → 1, 4; Q → 2, 4; R → 2, 3; S → 2

9. Match the following:

List – I (Type of reactions)		List– II (Characteristics)	
(P)	Exothermic reaction	(1)	Heat is evolved
(Q)	Endothermic reaction	(2)	Heat is absorbed
(R)	Hydrogenation reaction	(3)	Entropy change of surrounding is positive
(S)	Neutralization reaction	(4)	Pi-bonds are broken and sigma bonds are formed
		(5)	Combination of H^+ and OH^- ions takes place

- (A) P → 1, 3; Q → 2, 5; R → 1; S → 4 (B) P → 1, 3; Q → 2; R → 4; S → 5
 (C) P → 1; Q → 2, 3; R → 4; S → 5 (D) P → 1; Q → 2; R → 2, 4; S → 5

Space For Rough Work

10. Match the following:

List – I (Chemical equations)		List– II (Equivalent mass of underlined species)	
(P)	$2\text{NO} + \text{O}_2 \longrightarrow 2\text{NO}_2$	(1)	44
(Q)	$\underline{\text{C}} + \text{O}_2 \longrightarrow \text{CO}_2$	(2)	46
(R)	$\text{CaCO}_3 \longrightarrow \text{CaO} + \underline{\text{CO}_2}$	(3)	15
(S)	$\text{N}_2\text{O}_3 \longrightarrow \text{NO} + \underline{\text{NO}_2}$	(4)	3
		(5)	4

(A) P → 3; Q → 5; R → 1; S → 2

(B) P → 5; Q → 4; R → 2; S → 1

(C) P → 4; Q → 5; R → 1; S → 2

(D) P → 3; Q → 4; R → 1; S → 2

11. Match the following:

List – I (Change in state functions)		List– II (Characteristics)	
(P)	Change in internal energy(ΔU)	(1)	Has a definite sign for spontaneous processes
(Q)	Change in entropy of a system (ΔS)	(2)	Is equal to heat change at constant volume
(R)	Change in Gibb's energy(ΔG)	(3)	Has a negative sign for exothermic reactions at constant pressure
(S)	Change in enthalpy(ΔH)	(4)	Is a measure of randomness of a system
		(5)	Is always zero for a spontaneous process

(A) P → 3; Q → 2; R → 1; S → 4

(B) P → 2; Q → 4; R → 2; S → 1

(C) P → 3; Q → 2; R → 4; S → 5

(D) P → 2; Q → 5; R → 1; S → 3

(PART – B)**(Non – Negative Integer)**

- What is the sum of the total number of radial nodes present in the following atomic orbitals? 4s, 4p, 4d, 4f, 6p, 5d, 7s
- The value of $2.303 nRT$ of a thermodynamic system is 48 joule. How much work in joule unit is done on the system in an isothermal compression process if it's volume changes from 100 litre to 1 litre in reversible manner?

Space For Rough Work

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3. One litre aqueous solution contains 0.4 moles of NaOH, 0.2 mole of Na_2CO_3 and 0.2 moles of NaHCO_3 . How much mL of an aqueous solution of HCl of concentration 0.4 M is required to neutralize the salt solution in presence of methyl orange indicator?
 4. The molar heat capacity of an ideal gas is $20 \text{ JK}^{-1} \text{ mol}^{-1}$. How much heat in joule unit will be absorbed by heating 10 moles of the gas from 400 K to 420 K?
 5. The wavelength of the second Balmer line in hydrogen spectrum is λ_1 and that of the second line of Lyman series in hydrogen spectrum is λ_2 . If the ratio of $\lambda_1 : \lambda_2$ is $x : y$, what is the value of $(x + y)$?
 6. The bond energies of A – A bond is 100 kJ mol^{-1}
B – B bond is 400 kJ mol^{-1}
A – B bond is 200 kJ mol^{-1}
What is the heat of formation of AB_2 in kJ unit?
-

Space For Rough Work

SECTION – III: MATHEMATICS

(PART – A)

(Single Correct Answer Type)

This section contains **4 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

1. The distance of point B with position vector $\hat{i} + 2\hat{j} + 3\hat{k}$ from the line passing through the point A with position vector $4\hat{i} + 2\hat{j} + 2\hat{k}$ and parallel to the vector $2\hat{i} + 3\hat{j} + 6\hat{k}$ is

(A) $\sqrt{10}$	(B) $\sqrt{5}$
(C) $\sqrt{6}$	(D) $\sqrt{8}$

2. If the planes $bx - ay = n$, $cy - bz = l$ and $az - cx = m$ intersect in a line, then $al + bm + cn$ is equal to

(A) -1	(B) 0
(C) 1	(D) none of these

3. Let a_1, a_2, a_3, \dots be an arithmetic progression with common difference 2. Let S_n be the sum of first n terms of the sequence. If $\frac{S_{3n}}{S_n}$ does not depend on n then the sum of the first 10 terms of the sequence is

(A) 100	(B) 125
(C) 150	(D) 225

4. Consider a sequence $\{a_n\}$ with $a_1 = 2$ and $a_n = \frac{a_{n-1}^2}{a_{n-2}} \forall n \geq 3$. If a_2 and a_5 are positive integers and $a_5 \leq 512$, then number of possible value of a_5 are.

(A) 1	(B) 2
(C) 3	(D) 4

(One or More Than One Options Correct Type)

This section contains **3 multiple choice questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE or MORE THAN ONE is correct**.

5. If l, m, n are the direction cosines of the line of shortest distance between the lines $\frac{x-3}{2} = \frac{y+15}{-7} = \frac{z-9}{5}$ and $\frac{x+1}{2} = \frac{y-1}{1} = \frac{z-9}{-3}$ then

(A) $3l - 15m + n = 0$	(B) $2l - 7m + 5n = 0$
(C) $l = m = n = \frac{1}{\sqrt{3}}$	(D) $2l + m - 3n = 0$

Space For Rough Work

6. Vector \vec{A} and \vec{B} satisfying the vector equation $\vec{A} + \vec{B} = \vec{a}$ and $\vec{A} \times \vec{B} = \vec{b}$ and $\vec{A} \cdot \vec{a} = 1$, where \vec{a} and \vec{b} are given vectors, are

(A) $\vec{A} = \frac{(\vec{a} \times \vec{b}) - \vec{a}}{a^2}$ (B) $\vec{B} = \frac{(\vec{b} \times \vec{a}) + (a^2 - 1)\vec{a}}{a^2}$
 (C) $\vec{A} = \frac{(\vec{a} \times \vec{b}) + \vec{a}}{a^2}$ (D) $\vec{B} = \frac{(\vec{b} \times \vec{a}) - (a^2 - 1)\vec{a}}{a^2}$

7. Let \vec{a} , \vec{b} and \vec{c} be three non coplanar vectors and \vec{d} be a non zero vector. Which is perpendicular to $(\vec{a} + \vec{b} + \vec{c})$. Now if $\vec{d} = \sin\alpha(\vec{a} \times \vec{b}) + \cos\beta(\vec{b} \times \vec{c}) + 2(\vec{c} \times \vec{a})$.

(A) $\sin \alpha = -1$ (B) $\sin \alpha = 1$
 (C) $\cos \beta = -1$ (D) $\cos \beta = 1$

(Matching List Sets)

This section contains **FOUR (04)** Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question.

8. Let $a = (x + y)\hat{i} + x\hat{j} + x\hat{k}$, $b = (5x + 4y)\hat{i} + 4x\hat{j} + 2x\hat{k}$, and $c = (10x + 8y)\hat{i} + 8x\hat{j} + 3x\hat{k}$ let $f(x, y) = [abc]$. Match the expressions in column I with values in column 2

List - I		List - II	
(P)	$f(2, 2017)$	(1)	8
(Q)	$f(3, 2018)$	(2)	27
(R)	$f(2, 3)$	(3)	4034
(S)	$f(3, 2)$	(4)	6054
		(5)	6

(A) $P \rightarrow 1, Q \rightarrow 2, R \rightarrow 2, S \rightarrow 1$ (B) $P \rightarrow 1, Q \rightarrow 5, R \rightarrow 5, S \rightarrow 2$
 (C) $P \rightarrow 1, Q \rightarrow 2, R \rightarrow 1, S \rightarrow 2$ (D) $P \rightarrow 1, Q \rightarrow 3, R \rightarrow 4, S \rightarrow 2$

Space For Rough Work

9. Given three vectors

$$\vec{a} = \hat{i} + \hat{j} - \hat{k}, \vec{b} = \hat{i} - \hat{j} + \hat{k}, \vec{c} = \hat{i} + 2\hat{j} - \hat{k}$$

List - I		List - II	
(P)	A vector perpendicular to the vector \vec{a} and coplanar with \vec{a} and \vec{b}	(1)	$\left(\frac{1}{\sqrt{2}}\right)(-\hat{i} + 2\hat{j})$
(Q)	A vector perpendicular to \vec{a} and also perpendicular to the vector obtained in (P)	(2)	$\left(\frac{1}{\sqrt{2}}\right)(\hat{i} + \hat{k})$
(R)	A vector perpendicular to \vec{b} and \vec{c}	(3)	$\frac{1}{\sqrt{6}}(2\hat{i} - \hat{j} + \hat{k})$
(S)	A vector perpendicular to \vec{a} and $\vec{a} + \vec{c}$	(4)	$\left(\frac{1}{\sqrt{2}}\right)(\hat{j} + \hat{k})$
		(5)	$3(\hat{i} - \hat{j} + \hat{k})$

Which is correct option?

(A) $P \rightarrow 4, Q \rightarrow 3, R \rightarrow 1, S \rightarrow 2$

(B) $P \rightarrow 3, Q \rightarrow 2, R \rightarrow 1, S \rightarrow 4$

(C) $P \rightarrow 3, Q \rightarrow 4, R \rightarrow 2, S \rightarrow 1$

(D) $P \rightarrow 3, Q \rightarrow 4, R \rightarrow 1, S \rightarrow 2$

10. Match the following

List - I		List - II	
(P)	If $A(-4, 0, 3)$ and $B(14, 2, -5)$ then which one of the following points lie on the bisector of the angle between \vec{OA} and \vec{OB} (O is the origin of reference)	(1)	$(1, 1, -2)$
(Q)	The line $\frac{x}{3} = \frac{y}{2} = \frac{z+7}{1}$ meets the plane $x + y + z = 7 = 0$	(2)	$(0, 0, -7)$
(R)	Lines $\frac{x-1}{2} = \frac{y-1}{1} = \frac{z+2}{-6}$ and $\frac{x+1}{1} = \frac{y+1}{1} = \frac{z+6}{2}$ intersect at the point	(3)	$(2, 2, 4)$
(S)	Foot of the perpendicular from the origin on the plane $2x - 2y - 5z = 33$ is at the point.	(4)	$(3, -1, 0)$
		(5)	$(2, -2, -5)$

(A) $P \rightarrow 5, Q \rightarrow 1, R \rightarrow 4, S \rightarrow 2$

(B) $P \rightarrow 3, Q \rightarrow 2, R \rightarrow 1, S \rightarrow 5$

(C) $P \rightarrow 5, Q \rightarrow 1, R \rightarrow 3, S \rightarrow 5$

(D) $P \rightarrow 1, Q \rightarrow 2, R \rightarrow 5, S \rightarrow 3$

Space For Rough Work

11. Match each entry in **List – I** to the correct entry in **List – II**.

	List – I		List – II
(P)	The sum of the first 10 terms of a certain G.P. is equal to 244 times the sum of the first 5 terms. Then the common ratio is	(1)	9
(Q)	If S_1, S_2, S_3 are the sums of first n natural numbers, their squares, their cubes respectively, then $\frac{S_3(1+8S_1)}{S_2^2}$ is equal to	(2)	6
(R)	If S_r denotes the sum of the first r terms of an A.P., such that $S_{2n} = 3S_n$, then $\frac{S_{3n}}{S_n}$ is equal to	(3)	3
(S)	The next term of the sequence 10, 17, 28, 43, is	(4)	91
		(5)	62

The correct option is

- (A) $P \rightarrow (4)$ $Q \rightarrow (2)$ $R \rightarrow (5)$ $S \rightarrow (1)$ (B) $P \rightarrow (4)$ $Q \rightarrow (1)$ $R \rightarrow (2)$ $S \rightarrow (5)$
 (C) $P \rightarrow (3)$ $Q \rightarrow (1)$ $R \rightarrow (2)$ $S \rightarrow (5)$ (D) $P \rightarrow (1)$ $Q \rightarrow (5)$ $R \rightarrow (3)$ $S \rightarrow (4)$

(PART – B)

(Non – Negative Integer)

- It S denotes the area of the triangle with vertices $A(1, -1, 2)$, $B(2, 1, -1)$, $C(3, -1, 2)$ then is equal to
- Let $\vec{a}, \vec{b}, \vec{c}$ be three non – zero vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ and $\lambda \vec{b} \times \vec{a} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a} = \vec{0}$, then the value of λ is _____
- Let π be the plane containing the line $x + y - z - 1 = 0 = x + 4y + 3z$ and parallel to the line $6(x - 1) = 3y = 2(z + 1)$. The perpendicular distance of the plane π from origin is λ then value of $\lambda\sqrt{3}$ is
- Let 9 GM's are inserted between 100 and 3200. Then number of rational GM's are
- The sum $4 \sum_{r=2}^{\infty} \frac{1}{r^2 - 1}$ is equal to
- Let AP $(a; d)$ denote the set of all the terms of an infinite arithmetic progression with first term a and common difference $d > 0$. If $AP(1; 3) \cap AP(2; 5) \cap AP(3; 7) = AP(a; d)$
Then $a + d$ equals _____

Space For Rough Work

FIITJEE INTERNAL TEST

BATCH – NWCMSW425A1

Common Test – 7

Code:

JEE ADVANCED LEVEL

ANSWER KEY

ANSWER KEYS

Physics

PART – A

- | | | | |
|-------|---------|--------|------|
| 1. B | 2. B | 3. D | 4. C |
| 5. AD | 6. ABCD | 7. ABC | 8. B |
| 9. D | 10. A | 11. B | |

PART – B

- | | | | |
|------|------|------|------|
| 1. 4 | 2. 4 | 3. 6 | 4. 4 |
| 5. 2 | 6. 3 | | |

Chemistry

PART – A

- | | | | |
|--------|-------|-------|------|
| 1. B | 2. C | 3. B | 4. A |
| 5. ABC | 6. AB | 7. AB | 8. C |
| 9. B | 10. D | 11. B | |

PART – B

- | | | | |
|--------|-------|---------|---------|
| 1. 18 | 2. 96 | 3. 2500 | 4. 4000 |
| 5. 155 | 6. 50 | | |

Mathematics

PART – A

- | | | | |
|--------|-------|--------|------|
| 1. A | 2. B | 3. A | 4. D |
| 5. BCD | 6. BC | 7. ABC | 8. C |
| 9. D | 10. B | 11. C | |

PART – B

- | | | | |
|------|--------|------|------|
| 1. 3 | 2. 2 | 3. 1 | 4. 4 |
| 5. 3 | 6. 157 | | |