ALLEN®
CHENNAI, TAMILNADU

CLASSROOM CONTACT PROGRAMME
(Academic Session : 2024 - 2025)

TARGET : JEE (M + A) : 2026

CLASS : IIT-NURTURE (ELITE) PHASE - I & II

TEST TYPE: OFFLINE **DATE : 13.07.2026** **PATTERN : JEE ADVANCED**

Time : 3 Hours **INTERNAL TEST - 04** Maximum Marks : 198

Student's Form No. : ..... Batch : .....

Student's Name : .....

INSTRUCTIONS

READ THE INSTRUCTIONS CAREFULLY

QUESTION PAPER FORMAT AND MARKING SCHEME

1. The question paper has **three parts** : **PHYSICS, CHEMISTRY** and **MATHEMATICS**. Each part has **THREE SECTIONS**.
2. Carefully read the instructions given at the beginning of each section.
3. **Section I(i):** This section contains **SIX (06)** questions. Each question has Four options **(A), (B), (C) and (D). ONLY ONE** of these four options is correct. **SINGLE CHOICE QUESTIONS**

   Marking scheme : +3 for correct answer, 0 if not attempted and **–1** in all other cases.
3. **Section I(ii):** This section contains **SIX (06)** questions. The Answer to each question is a **ONE OR MORE THAN ONE CORRECT OPTIONS (MCQ)**

   Marking scheme : +4 for correct answer, 0 if not attempted and **–2** in all other cases.

   Partial Marks : +3 If all the four options are correct but ONLY three options are chosen.

   Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct options.

   Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option.
5. **Section II:** This section contains **SIX (06)** questions. **The answer to each question is a NUMERICAL VALUE.**

   Marking scheme : +4 If ONLY the correct numerical value is entered. 0 In all other cases.

SOME USEFUL CONSTANTS	
Atomic No.	H = 1, B = 5, C = 6, N = 7, O = 8, F = 9, Al = 13, P = 15, S = 16, Cl = 17,Br = 35, Xe = 54, Ce = 58,
Atomic masses :	H = 1, Li = 7, B = 11, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Al = 27, P = 31, S = 32, Cl = 35.5, Ca = 40, Fe = 56, Br = 80, I = 127, Xe = 131, Ba = 137, Ce = 140,

• **Boltzmann constant**	$k = 1.38 \times 10^{-23}\ JK^{-1}$
• **Coulomb's law constant**	$\frac{1}{4\pi\varepsilon_0} = 9\times10^{9}$
• **Universal gravitational constant**	$G = 6.67259 \times 10^{-11}\ N\text{–}m^2\ kg^{-2}$
• **Speed of light in vacuum**	$c = 3 \times 10^{8}\ ms^{-1}$
• **Stefan–Boltzmann constant**	$\sigma = 5.67 \times 10^{-8}\ Wm^{-2}\text{–}K^{-4}$
• **Wien's displacement law constant**	$b = 2.89 \times 10^{-3}\ m\text{–}K$
• **Permeability of vacuum**	$\mu_0 = 4\pi \times 10^{-7}\ NA^{-2}$
• **Permittivity of vacuum**	$\in_0 = \frac{1}{\mu_0 c^2}$
• **Planck constant**	$h = 6.63 \times 10^{-34}\ J\text{–}s$

INTERNAL TEST - 04 IIT-NURTURE (ELITE)

PHASE 1 & 2

PATTERN : JEE ADVANCED	**DATE: 13.07.2026**
SYLLABUS	
PHYSICS :	Mathematical Tools & Vectors, Rectilinear Motion, Projectile Motion, Relative Motion.
CHEMISTRY :	Atomic Structure And Some Basic Concept Of Chemistry.
MATHS :	Basic Mathematics Including Logarithm (Except trig. Formula & limits).

PHYSICS

SECTION-I(i) : (Maximum Marks: 18)

- This section contains **SIX (06)** questions.
- Each question has Four options (A), (B), (C) and (D). **ONLY ONE** of these four options is correct.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme :

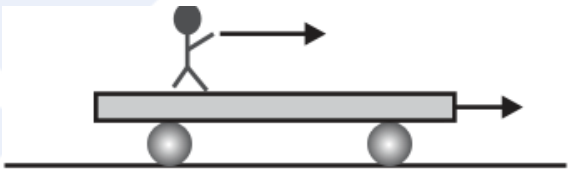
Full Marks : +3 If ONLY the correct option is chosen.
Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered)
Negative Marks : –1 In all other cases

---

1. A man walks 30 m towards north, then 20 m towards east and in the last $30\sqrt{2}$m towards south-west. The displacement from origin is :

(A) 10m towards east
(B) 10 m towards west
(C) $60\sqrt{2}$m towards north west
(D) $60\sqrt{2}$m towards east north

2. A trolley is moving horizontally with a constant velocity of v m/s w.r.t. earth. A man starts running from one end of the trolley with a velocity 1.5v m/s w.r.t. to trolley. After reaching the opposite end, the man turn back and continues running with a velocity of 1.5 v m/s w.r.t. the trolley in the backward direction. If the length of the trolley is L then the displacement of the man with respect to earth during the time he reaches to starting point?



(A) 1.5 L
(B) 2.5 L
(C) $\frac{4L}{3}$
(D) $\frac{5L}{3}$

3. A girl is walking on a road with velocity of 8 kph. Suddenly rain starts falling at 10 kph in vertically downward direction. The velocity of rain w.r.t to girl is :

(A) $\sqrt{7}$kph
(B) $\sqrt{13}$kph
(C) $\sqrt{164}$kph
(D) $\sqrt{6}$kph

4. With what speed should a body the thrown upwards so that the distances travelled in 5^{th} second and 6^{th} second are equal?

(A) 58.4 m/s
(B) 49 m/s
(C) 98 m/s
(D) $\sqrt{98}$ m/s

5. A ball thrown up in vacuum returns after 12 sec. Its position after five seconds will be same as after

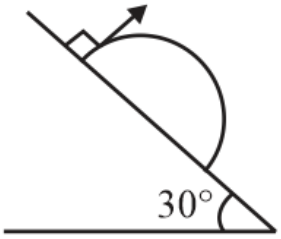
(A) 7 sec

(B) 3 sec

(C) 3.5 sec

(D) 4 sec

6. A ball is projected from point A with a velocity 10 m/s perpendicular to the inclined plane as shown in figure. Range of the ball on the inclined plane is :



(A) $\frac{20}{13}$m

(B) $\frac{13}{40}$m

(C) $\frac{40}{3}$m

(D) $\frac{13}{20}$m

SECTION-I(ii) : (Maximum Marks: 24)

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options. **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s)
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+4	If only (all) the correct option(s) is (are) chosen.
Partial Marks	:	+3	If all the four options are correct but ONLY three options are chosen.
Partial Marks	:	+2	If three or more options are correct but ONLY two options are chosen and both of which are correct.
Partial Marks	:	+1	If two or more options are correct but ONLY one option is chosen and it is a correct option.
Zero Marks	:	0	If none of the options is chosen (i.e. the question is unanswered).
Negative Marks	:	–2	In all other cases.

- **For Example :** If first, third and fourth are the **ONLY** three correct options for a question with second option being an incorrect option; selecting only all the three correct options will result in +4 marks. Selecting only two of the three correct options (e.g. the first and fourth options), without selecting any incorrect option (second option in this case), will result in +2 marks. Selecting only one of the three correct options (either first or third or fourth option), without selecting any incorrect option (second option in this case), will result in +1 marks. Selecting any incorrect option(s) (second option in this case), with or without selection of any correct option(s) will result in –2 marks.

---

7. If $\vec{A} = 2\hat{i} + \hat{j} + \hat{k}$ & $\vec{B} = \hat{i} + \hat{j} + \hat{k}$ are two vectors, then the unit vector

(A) Perpendicular to $\vec{A}$ is $\frac{-\hat{j} + \hat{k}}{\sqrt{2}}$.

(B) Parallel to $\vec{A}$ is $\frac{2\hat{i} + \hat{j} + \hat{k}}{\sqrt{6}}$.

(C) Perpendicular to $\vec{B}$ is $\left(\frac{-\hat{j} + \hat{k}}{\sqrt{2}}\right)$.

(D) Parallel to $\vec{A}$ is $\frac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{3}}$.

8. A force of $\sqrt{3}$N makes equal angles with X-axis, Y-axis and Z-axis. The possible value of force are

(A) $(\hat{i} + \hat{j} + \hat{k})$N

(B) $(-\hat{i} + \hat{j} - \hat{k})$N

(C) $(-\hat{i} - \hat{j} - \hat{k})$N

(D) $(-\hat{i} + \hat{j} + \hat{k})$N

9. Check up the only correct statements in the following

(A) A body having a constant velocity still can have varying speed.

(B) A body having a constant speed can have varying velocity.

(C) A body having constant speed can have an acceleration.

(D) If velocity and acceleration are in the same direction, then distance is equal to displacements.

10. A particle moves along a straight line and its velocity depends on time as $v = 4t - t^2$. Then for first 5 seconds.

(A) Average velocity is $\frac{25}{3}$m/s.

(B) Average speed is 10 m/s.

(C) Average velocity is $\frac{5}{3}$m/s.

(D) Acceleration velocity is $4m/s^2$ at t = 0.

11. Mark the correct statement(s) :

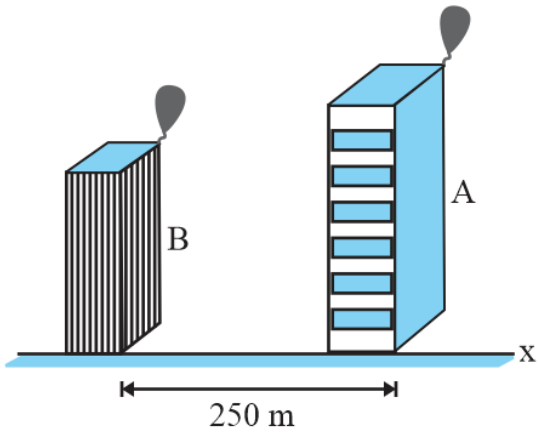
(A) A particle can have zero displacement and non-zero average velocity.

(B) A particle can have zero displacement and non-zero velocity.

(C) A particle can have zero acceleration and non-zero velocity.

(D) A particle can have zero velocity and non-zero acceleration

12. Two balloons are simultaneously released from two buildings A and B. Balloon from A rises with constant velocity 10 m/s, While the other one rises with constant velocity of 20 m/s. Due to wind the balloons gather horizontal velocity $V_x = 0.5$ y, where y is the height from the point of release. The buildings are at a distance of 250 m and after some time t the balloons collide. Choose the correct option(s) :



(A) t = 5 seconds

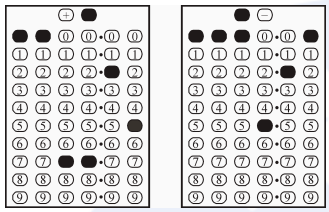
(B) difference in height of buildings is 100 m.

(C) difference in height of buildings is 500 m.

(D) t = 10 seconds

SECTION-II : (Maximum Marks: 24)

- This section contains **SIX (06)** questions. The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value of the answer in the place designated to enter the answer. If the numerical value has more than two decimal places, **truncate/round-off** the value to **Two** decimal places; e.g. 6.25, 7.00, –0.33, –.30, 30.27, –127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct)



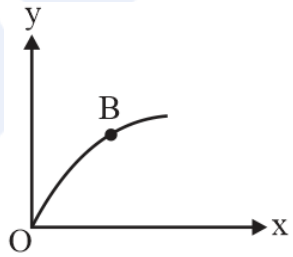
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4 If ONLY the correct numerical value is entered.
Zero Marks : 0 In all other cases.

---

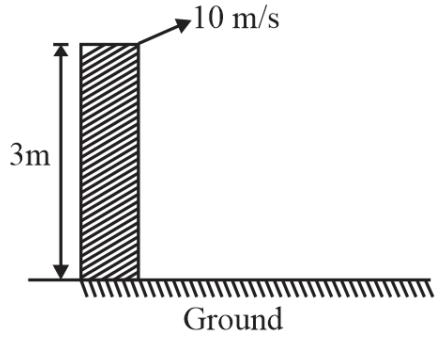
1. A particle is projected vertically up with initially velocity 45 m/s. Distance travelled in 5^{th} second ($g = 10\ m/s^2$) = n/2. Then the value of n is ___.

2. A particle is moving in XY-plane. It starts to move from origin O at an angle α with X-axis.

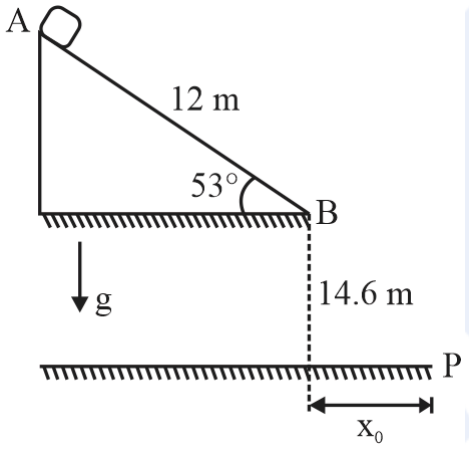


It has a constant acceleration in negative Y-direction. After some time it passes through a point B in a direction making angle β with the X-axis. If OB makes $\theta = 45°$ angle with the X-axis, find the value of $\tan\alpha + \tan\beta$.

3. A stone is projected from top of a vertical pole of height 3 m with initial velocity 10 m/s. The maximum range on the ground is $x\sqrt{10}$ m.Find the value of x is _____. ($g = 10\ m/s^2$)



4. A particle starts from point A and moves under the action of some forces that lead it to have an acceleration of 6 m/s^2 until it reaches B after which it is in free fall. It finally strikes point P after travelling some distance in air. If $x_0 = \frac{36}{n}$m. Find the value of n is_____. (g = 10 m/s^2)



5. In a square cut, the speed of the cricket ball changes from 30 m/s to 40m/s during the time of its contact $\Delta t = 0.01s$ with the bat. If the ball is deflected by the bat through an angle of $\theta = 90°$. The magnitude of the average acceleration of the ball is $n \times 10^3$ m/s^2. Then the value of n is _____.

6. A particle is projected up an inclined plane of inclination β at an elevation α to the horizontal. Find the ratio between tan α and tan β, if the particle strikes the plane horizontally.

CHEMISTRY

SECTION-I(i) : (Maximum Marks: 18)

- This section contains **SIX (06)** questions.
- Each question has Four options (A), (B), (C) and (D). **ONLY ONE** of these four options is correct.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +3 If ONLY the correct option is chosen.
Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered)
Negative Marks : –1 In all other cases

---

1. The dissociation energy of H_2 is 430.53 kJ/mol. If H_2 is dissociated by illumination with radiation of wavelength 253.7 nm. The fraction of the radiant energy which will be converted into K.E is given by :

(A) 8.86 %
(B) 2.33 %
(C) 1.3 %
(D) 90%

2. 1.61 gm of $Na_2SO_4.10H_2O$ contains same number of oxygen atoms as present in

(A) 0.98 gm H_2SO_4
(B) 0.08 gm SO_3
(C) 1.78 gm $H_2S_2O_7$
(D) 0.05 gm $CaCO_3$

3. The wavelength of the first Lyman lines of hydrogen, He^+ and Li^{2+} ions are λ_1, λ_2, λ_3. The ratio of these wavelengths is :

(A) 1 : 4 : 9
(B) 9 : 4 : 1
(C) 36 : 9 : 4
(D) 6 : 3 : 2

4. Diborane tetrachloride was treated with NaOH and the following reaction occurred

$$B_2Cl_4 + NaOH \longrightarrow NaBO_2 + H_2O + H_2 + NaCl.$$

If 1362 ml of hydrogen gas is formed at STP, how much amount of B_2Cl_4 was consumed?

(A) 9.97 g
(B) 9.84 g
(C) 0.0968 g
(D) 23.57 g

5. For which orbit in He^+ ion, the circumference is 26.5$\overset{o}{A}$?

(A) 2
(B) 4
(C) 3
(D) 16

6. The mass composition of universe may be given as 90% H_2 and 10% He. The average molecular mass of universe should be :

(A) 2.20
(B) 2.10
(C) 3.80
(D) 3.64

SECTION-I(ii) : (Maximum Marks: 24)

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options. **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s)
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+4	If only (all) the correct option(s) is (are) chosen.
Partial Marks	:	+3	If all the four options are correct but ONLY three options are chosen.
Partial Marks	:	+2	If three or more options are correct but ONLY two options are chosen and both of which are correct.
Partial Marks	:	+1	If two or more options are correct but ONLY one option is chosen and it is a correct option.
Zero Marks	:	0	If none of the options is chosen (i.e. the question is unanswered).
Negative Marks	:	–2	In all other cases.

- **For Example :** If first, third and fourth are the **ONLY** three correct options for a question with second option being an incorrect option; selecting only all the three correct options will result in +4 marks. Selecting only two of the three correct options (e.g. the first and fourth options), without selecting any incorrect option (second option in this case), will result in +2 marks. Selecting only one of the three correct options (either first or third or fourth option), without selecting any incorrect option (second option in this case), will result in +1 marks. Selecting any incorrect option(s) (second option in this case), with or without selection of any correct option(s) will result in –2 marks.

---

7. The density of a liquid 1.2 gm/mL. There are 25 drops in 2 mL. The number of molecules in one drop is: [Given molecular mass of liquid = 50 amu]

(A) $\frac{6}{5} \times \frac{1}{(25)^2} N_A$

(B) $\left(\frac{1}{25}\right)^2 N_A$

(C) $\frac{1.2}{(25)^2} N_A$

(D) $1.2 \times 25\ N_A$

8. Which of the following statements is/are correct regarding an oxide of iron, in which the mass per cent of iron and oxygen are 69.9 and 30.1, respectively ? (Fe = 56 g/mol)

(A) The minimum molecular mass of the compound is 160.

(B) The minimum molecular mass of the compound is 272

(C) If all O^{16} atoms are replaced by O^{18}, the new mass per cent of O is 32.5%

(D) If all O^{16} atoms are replaced by O^{18}, the new mass per cent of O is 28.9%

9. In a H-like sample electrons make transition from 4^{th} excited state to 2^{nd} state then :

(A) 10 different spectral lines are observed

(B) 6 different spectral lines are observed.

(C) Number of lines belonging to the balmer series is 3.

(D) Number of lines belonging to paschen series is 2.

10. Calculate mass % and mole % of H_2 in a mixture of H_2 and O_2 if average molecular mass of the mixture is 14?

(A) 50% by mole

(B) 60% by mole

(C) 8.57% by mass

(D) 10% by mass

11. Which of the following is/are correct statement(s)?

(A) 3s orbital is spherically symmetrical with two nodes.

(B) $d_{x^2-y^2}$ orbitals has lobes of electron density in XY-plane along X and Y-axis.

(C) The radial probability curve RPDF vs. r of 1s, 3p and 5d have one, two and three maxima.

(D) $3d_{z^2}$ has zero electron density in XY-plane.

12. As an electron jumps from the fourth orbit to the second orbit in Be^{3+} ion, its :

(A) K.E increases

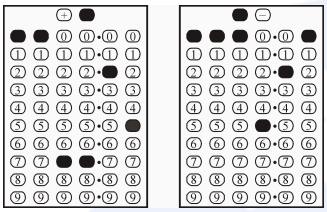
(B) Speed increases

(C) Frequency of revolution increases

(D) |PE| decreases

SECTION-II : (Maximum Marks: 24)

- This section contains **SIX (06)** questions. The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value of the answer in the place designated to enter the answer. If the numerical value has more than two decimal places, **truncate/round-off** the value to **Two** decimal places; e.g. 6.25, 7.00, –0.33, –.30, 30.27, –127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct)



- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4 If ONLY the correct numerical value is entered.
Zero Marks : 0 In all other cases.

---

1. For a 3s-orbital

$$\psi(3s)=\frac{1}{9\sqrt{3}}\left(\frac{1}{a_0}\right)^{3/2}(6-6\sigma+\sigma^2)e^{-\sigma/2}$$

$$\text{where } ; \sigma=\frac{2rz}{3a_0}$$

the maximum distance of radial node from nucleus is $\frac{A}{B}\frac{(C+\sqrt{3})}{z}a_0$

Calculate $\frac{(A+B)^2-C^2}{4}$

2. Calculate minimum uncertainty involved in the location of a particle whose de Broglie wavelength is $\sqrt{150\pi}\,\text{Å}$ with an uncertainty of 0.01 π Å. Express answer in nm.

3. Specific charges of two particles A and B are in ratio 2 : 3. If their mass ratio $m_A : m_B$ is 2 : 3, then the value of $\frac{18}{8}\times\left(\frac{q_A}{q_B}\right)$ is ___.

4. What is the quantity of water (in g) that should be added to 16 g methanol to make the mole fraction of methanol as 0.25?

5. Not considering the electronic spin the degeneracy of the second excited state of H-atom is 9, while the degeneracy of the second excited state of Li^+ is ___.

6. Calculate the mass of urea (NH_2CONH_2) containing 1 gram-atom H.

MATHEMATICS

SECTION-I(i) : (Maximum Marks: 18)

- This section contains **SIX (06)** questions.
- Each question has Four options (A), (B), (C) and (D). **ONLY ONE** of these four options is correct.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +3 If ONLY the correct option is chosen.
Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered)
Negative Marks : –1 In all other cases

---

1. Number of solution(s) of the equation $\log_2(x^2+3) = \frac{1}{2}\log_{1/3}\left(x+\frac{1}{x}\right)$, $x > 0$ is :

(A) 0 (B) 1 (C) 2 (D) Infinite

2. Check whether following statements are True or False and mark the correct order :

$S_1 : 3^{\sqrt{\log_3 7}} = 7^{\sqrt{\log_7 3}}$

S_2 : Number of solution to the equation $x^{\log_{10}2x} = 5$ is 2.

S_3 : Solution set of $\frac{(x-2)}{(x-4)} \leqslant 0$ is $x \in [2, 4]$.

S_4 : Solution set of the inequality $\left(\frac{1}{3}\right)^{\log_{1/9}\left(x^2-\frac{10}{3}x+1\right)} \leqslant 1$ is $x \leqslant \frac{10}{3}$.

(A) T F F T (B) T T F F (C) T T T F (D) F T T F

3. $N = \frac{81^{\frac{1}{\log_5 9}} + 3^{\frac{3}{\log_{\sqrt{6}}3}}}{409}\left(\left(\sqrt{7}\right)^{\frac{2}{\log_{25}7}} - (125)^{\log_{25}6}\right)$, then $\log_2 N$ has the value

(A) 0 (B) 1 (C) –1 (D) None of these

4. Solution set of the inequality $\log_{10}^2 x - 3(\log_{10}x)(\log_{10}(x-2)) + 2\log_{10}^2(x-2) < 0$, is :

(A) (0, 4) (B) $(-\infty, 1)$ (C) $(4, \infty)$ (D) (2, 4)

5. Product of all values of x satisfying the equation $\sqrt{2^x\sqrt[3]{4^x(0.125)^{1/x}}} = 4\left(\sqrt[3]{2}\right)$ is :

(A) $\frac{14}{5}$ (B) 3

(C) $-\frac{1}{5}$ (D) $-\frac{3}{5}$

6. The product of all values of x satisfying the equation $|x-1|^{\log_3 x^2 - 2\log_x 9} = (x-1)^7$, is :

(A) 162 (B) 81

(C) $\frac{162}{\sqrt{3}}$ (D) $\frac{81}{\sqrt{3}}$

SECTION-I(ii) : (Maximum Marks: 24)

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options. **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s)
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+4	If only (all) the correct option(s) is (are) chosen.
Partial Marks	:	+3	If all the four options are correct but ONLY three options are chosen.
Partial Marks	:	+2	If three or more options are correct but ONLY two options are chosen and both of which are correct.
Partial Marks	:	+1	If two or more options are correct but ONLY one option is chosen and it is a correct option.
Zero Marks	:	0	If none of the options is chosen (i.e. the question is unanswered).
Negative Marks	:	–2	In all other cases.

- **For Example :** If first, third and fourth are the **ONLY** three correct options for a question with second option being an incorrect option; selecting only all the three correct options will result in +4 marks. Selecting only two of the three correct options (e.g. the first and fourth options), without selecting any incorrect option (second option in this case), will result in +2 marks. Selecting only one of the three correct options (either first or third or fourth option), without selecting any incorrect option (second option in this case), will result in +1 marks. Selecting any incorrect option(s) (second option in this case), with or without selection of any correct option(s) will result in –2 marks.

---

7. The equation $x^{\frac{3}{4}(\log_2 x)^2+\log_2 x-\frac{5}{4}} = \sqrt{2}$, has

(A) at least one real solution

(B) exactly three solutions

(C) exactly one irrational solution

(D) complex roots

8. Consider the quadratic equation, $(\log_{10}8)x^2 - (\log_{10}5)x = 2(\log_2 10)^{-1} - x$. Which of the following quantities are rational?

(A) Sum of roots

(B) Product of roots

(C) (Sum of roots) × (Product of roots)

(D) None of these

9. If positive p, q, r satisfy pqr = 1, then for equation $\frac{2px}{pq+p+1}+\frac{2qx}{qr+q+1}+\frac{2rx}{rp+r+1}=1$, x equals :

(A) p + q + r

(B) 1

(C) Independent of p, q and r

(D) 1/2

10. Interval containing all the solutions of the equality $7^{x+2}-\frac{1}{7}.7^{x+1}-14.7^{x-1}+2.7^{x}=48$, is

(A) $\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$

(B) (π, π^2)

(C) $(-\pi, \pi)$

(D) $(-e, e)$

11. If $\log_4 5 = x$ and $\log_5 6 = y$, then

(A) $\log_4 6 = xy$

(B) $\log_6 4 = xy$

(C) $\log_3 2 = \frac{1}{2xy-1}$

(D) $\log_2 3 = \frac{1}{2xy-1}$

12. For the equation $\log_{3\sqrt{x}} x + \log_{3x}\sqrt{x} = 0$, which of the following do not hold good?

(A) no real solution

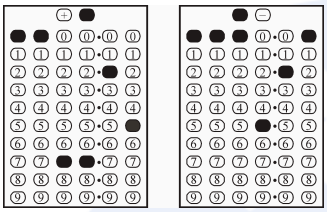
(B) one prime solution

(C) one integral solution

(D) no irrational solution

SECTION-II : (Maximum Marks: 24)

- This section contains **SIX (06)** questions. The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value of the answer in the place designated to enter the answer. If the numerical value has more than two decimal places, **truncate/round-off** the value to **Two** decimal places; e.g. 6.25, 7.00, –0.33, –.30, 30.27, –127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct)



- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4 If ONLY the correct numerical value is entered.
Zero Marks : 0 In all other cases.

---

1. The number of negative integral values of x satisfying the inequality

$\log_{\left(x+\frac{5}{2}\right)}\left(\frac{x-5}{2x-3}\right)^2 < 0$ is:

2. Find x, if

$$\begin{vmatrix} 4^{\frac{x}{y}+\frac{y}{x}} = 32 \\ \log_3(x-y)+\log_3(x+y)=1 \end{vmatrix}$$

3. If set of all real values of x satisfying
$|x^2-3x-1| < |3x^2+2x+1| + |2x^2+5x+2|, x^2-3x-1 \neq 0$ is
$(-\infty, -a) \cup (-b, \infty)$, then find the value of a + log ab.

4. If $x = \sqrt{\log_{11}7}, y = \sqrt{\log_7 11}$, then the value of $e^{y\log_e 7 - x\log_e 11}$.

5. If $\log_x \log_{18}\left(\sqrt{2}+\sqrt{8}\right) = \frac{1}{3}$, then the value of 32x =

6. Find the number of real values of x satisfying the equation

$\log_2\left(4^{x+1}+4\right).\log_2\left(4^x+1\right) = \log_{\frac{1}{\sqrt{2}}}\sqrt{\frac{1}{8}}$