Test Pattern

JEE (Main)
MINOR
29-06-2024

CLASSROOM CONTACT PROGRAMME

(Academic Session : 2024-2025)

IIT-NURTURE (ELITE) PHASE-1 & 2

Time : 3.00 Hours | Maximum Marks : 300

T3

IMPORTANT NOTE : Students having 8 digits **Form No.** must fill two zero before their **Form No.** in OMR. For example, if your **Form No.** is 12345678, then you have to **fill 0012345678**.

READ THE INSTRUCTIONS CAREFULLY

Important Instructions :

1. Immediately fill in the form number on this page of the Test Booklet and OMR sheet (Side-1 & Side-2) with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. The candidates should not write their Form Number anywhere else (except in the specified space) on the Test Booklet/Answer Sheet.
3. The Test Booklet consists of 90 questions.
4. There are **three** parts in the question paper 1,2,3 consisting of **Physics**, **Chemistry** and **Mathematics** having **30 questions** in each subject and each subject having **Two sections**.
   (a) Section-I contains 20 **multiple choice** questions with **only one correct** option.
   Marking scheme : +4 for correct answer, 0 if not attempted and –1 in all other cases.
   (b) Section-II contains 10 **Numerical Value Type** questions. Attempt any 5 questions. First 5 attempted questions will be considered for marking.
   Marking scheme : +4 for correct answer, 0 if not attempted and –1 in all other cases.
5. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electronic device etc, except the Identity Card inside the examination hall/room.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Room/Hall. **However, the candidate are allowed to take away this Test Booklet with them**.
8. **Do not fold or make any stray marks on the Answer Sheet**.
9. **Take g = 10 m/s^2 unless otherwise stated**.

Name of the Candidate (in Capitals) : _____

Form Number : in figures _____

: in words _____

Centre of Examination (in Capitals) : _____

Candidate's Signature : _____ **Invigilator's Signature :** _____

DO NOT BREAK THE SEALS WITHOUT BEING INSTRUCTED TO DO SO BY THE INVIGILATOR

Your Target is to secure Good Rank in JEE(Main) 2026

Topic : Rectilinear Motion, Projectile Motion.

PHYSICS

SECTION-I : (Maximum Marks: 80)

This section contains **20 questions**. Each question has 4 options for correct answer. Multiple-Choice Questions (MCQs) **Only one option is correct**. For each question, marks will be awarded as follows:

Full Marks : +4 If correct answer is selected.

Zero Marks : 0 If none of the option is selected.

Negative Marks : –1 If wrong option is selected.

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1. A projectile is projected from origin. It reaches a height 'h' ($<H_{max}$) at x = 3m and at x = 6m. Find the range

(A) 16 (B) 18 (C) 10 (D) 9

2. The displacement of a body from a reference point, is given by $\sqrt{x} = 2t + 3$, where x is in metres and t in seconds. This shows that body is :

(A) at rest (B) accelerated

(C) decelerated (D) in uniform motion

3. A particle initially (i.e. at t = 0) moving with a velocity u is subjected to a retarding force, as a result of which it decelerated at a rate $a = -k\sqrt{v}$. Where v is the instantaneous velocity and k is a positive constant. The time taken (T) by the particle to come to rest is given by :

(A) $T = \frac{2\sqrt{u}}{k}$ (B) $T = \frac{2u}{k}$

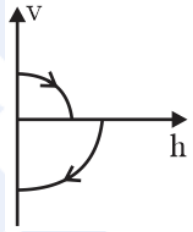
(C) $T = \frac{2u^{3/2}}{k}$ (D) $T = \frac{2u^2}{k}$

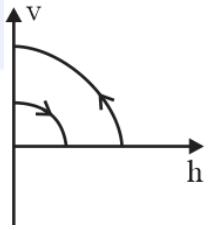
4. A stone dropped from a building of height h reaches the ground after t seconds. From the same building if two stones are thrown (one upward) and other (downwards) with same speed u and they reach the ground after t_1 and t_2 seconds respectively then the time interval t is :

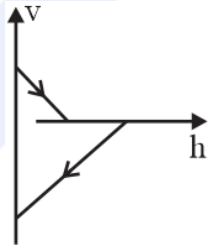
(A) $t = t_1 - t_2$ (B) $t = \frac{t_1 + t_2}{2}$

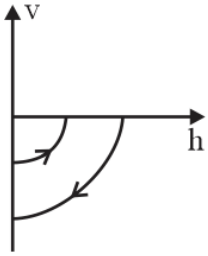
(C) $t = \sqrt{t_1 t_2}$ (D) $t = \sqrt{t_1^2 - t_2^2}$

5. A ball is dropped vertically from a height 'h' above the ground. It hits the ground and bounces up vertically to a height h/2. Neglecting subsequent motion and air resistance, its velocity v varies with the height h as :

(A) 

(B) 

(C) 

(D) 

6. A body is projected with a velocity u at an angle θ with the horizontal. The velocity of the body will become perpendicular to the velocity of projection after a time t is given by :

(A) $\frac{2u\sin\theta}{g}$ (B) $\frac{u\sin\theta}{g}$

(C) $\frac{2u}{g\sin\theta}$ (D) $\frac{u}{g\sin\theta}$

7. A projectile has the same range R when the maximum height attained by it is either h_1 or h_2. Then R, h_1 and h_2 will be related as :

(A) $R = \sqrt{h_1 h_2}$ (B) $R = 2\sqrt{h_1 h_2}$

(C) $R = 4\sqrt{h_1 h_2}$ (D) $R = 3\sqrt{h_1 h_2}$

8. A body is projected with a velocity $v = (3\hat{i} + 4\hat{j})$ m/s. The maximum height attained by the body is : ($g = 10\ m/s^2$)

(A) 0.8 m (B) 8 m

(C) 80 m (D) 800 m

9. A projectile is projected from level ground, what is the angle between initial and final velocity when range is maximum?

(A) 45° (B) 120°

(C) 66° (D) 90°

10. A projectile is projected from the bottom of an inclined plane of inclination 'β'. If the angle of projection is 'α' and it strikes the inclined plane horizontally then : (α with respect to horizontal)

(A) $2\tan\beta = \tan\alpha$ (B) $\tan\beta = 2\tan\alpha$

(C) $\tan\beta = 3\tan\alpha$ (D) $\tan\alpha = 3\tan\beta$

11. A particle is moving with a velocity $\vec{v} = k(y\hat{i} + x\hat{j})$, where K is a constant. The general equation for its path is

(A) $y^2 = x$ + constant

(B) $y = x^2$ + constant

(C) $y^2 = x^2$ + constant

(D) xy = constant

12. A ball is projected horizontally with a velocity of 5 m/s from the top of a building 19.6 m high. How long will the ball take to hit the ground?

(A) $\sqrt{2}$ s (B) 2 s (C) $\sqrt{3}$ s (D) 3 s

13. A projectile has a maximum range of 200 m. What is the maximum height attained by it if thrown to attain the maximum range?

(A) 25 m (B) 50 m

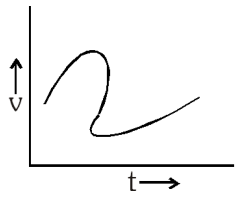
(C) 75 m (D) 100 m

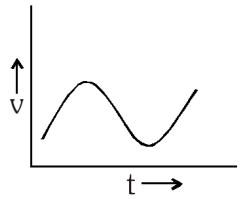
14. A projectile has a range R and time of flight T. If the range doubled (by increasing the speed of projection, without changing the angle of projection) the time of flight will become :

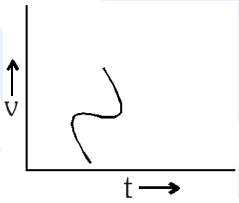
(A) $\frac{T}{\sqrt{2}}$ (B) $\sqrt{2}\,T$

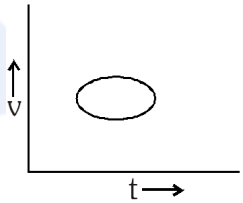
(C) $\frac{T}{2}$ (D) 2 T

15. Which of the following velocity–time graph shows a realistic situation for a body in motion?

(A) 

(B) 

(C) 

(D) 

16. A particle is projected at 30° to the horizontal with kinetic energy K. The kinetic energy at highest point is :-

(A) K (B) 0 (C) $\frac{K}{4}$ (D) $\frac{3}{4}$ K

17. A ball is thrown vertically downward with a velocity 'u' from the top of the tower. If strikes the ground with a velocity 3u. The time taken by the ball to reach the ground is given by :

(A) $\frac{u}{g}$ (B) $\frac{2u}{g}$ (C) $\frac{3u}{g}$ (D) $\frac{4u}{g}$

18. A body moving in a straight line with an initial velocity of 5 m/s and a constant acceleration, covers a distance of 30 m in the third second. How much distance will it cover in next two seconds?

(A) 70 m (B) 80 m

(C) 90 m (D) 100 m

19. A bullet is fired vertically upwards with an initial velocity of 50 m/s. If $g = 10\ m/s^2$, what is the ratio of the distance travelled by the bullet during the first and the last second of its upward motion?

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

20. The acceleration a (in m/s^2) of a body starting from rest varies with time t (in s) according to the relation a = 3t + 4. The velocity of the body at time t = 2s will be :

(A) 10 m/s (B) 12 m/s

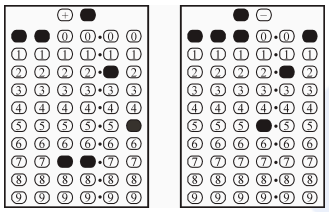
(C) 14 m/s (D) 16 m/s

SECTION-II : (Maximum Marks: 20)

This section contains 10 questions Candidates have to attempt any 5 questions out of 10. If more than 5 questions are attempted, then only first 5 attempted questions will be evaluated.

The answer to each question is a **Numerical Value** Type questions.

For each question, enter the correct numerical value (in decimal notation, truncated/rounded off to the second decimal place; 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 correct answer is entered.

Zero Marks : 0 If the question is unanswered.

Negative Marks : –1 If wrong answer is entered.

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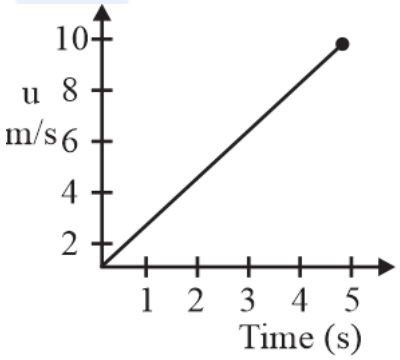
1. The speed versus time graph for a particle is shown in figure. The distance travelled in (m) by the particle during the time interval t = 0 to t = 5s will be____.



2. If the velocity of a body related to displacement is given by $v = \sqrt{5000 + 24x}$ m/s, then the acceleration of the body is ___ m/s^2.

3. If a particle start with initial velocity $u = \frac{1}{2}$m/s and acceleration 1 m/s^2 in straight line. Find displacement of particle in 3rd sec.

4. A student cycles from his house to the school situated at a distance of 1.2 km. He covers first 700 m at a speed of 7 m/s and next 500 m at a speed of 5 m/s. What is his average speed? (in m/s)

5. The velocity (v) of a particle is related to time (t) elapsed as v = kt, where k = 4 m/s^2. What is the distance (in m) travelled in initial 2 seconds?

6. A projectile reaches a certain height h($<H_{max}$) at time t_1 = 3 sec and time t_2 = 5 sec. Find the time of flight.

7. A car is traveling at 20 m/s. The driver applies the brakes, and the car slows with 4.0 m/s^2. The stopping distance(in m) is x_0. The value of $\frac{x_0}{10}$ is ____.

8. The speed of a particle is given by V = A sinωt, where 'A' and 'ω' is constant. Find the average speed of the particle for the interval t = 0 to t = $\frac{2\pi}{\omega}$.

9. An object having velocity 4 m/s is accelerated at the rate of 1.2 m/s^2 for 5 seconds. The distance travelled during this period of acceleration is ____ m.

10. Acceleration of a particle is given by a = b – cv, where b, c are constants and 'v' is velocity. If the particle is at rest at t = 0. Determine the speed of the particle after long has elapsed ($t \longrightarrow \infty$) if b = 4 and c = 2.

Topic : Atomic Structure (Except Schrodinger Wave Equations).

CHEMISTRY

SECTION-I : (Maximum Marks: 80)

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1. The potential energy of the electron present in the ground state of Li^{2+} ion is represented by : (r = radius of ground state)

(A) $\frac{3e}{4\pi\varepsilon_0}$ (B) $-\frac{3e}{4\pi\varepsilon_0 r}$

(C) $-\frac{3e^2}{4\pi\varepsilon_0 r^2}$ (D) $-\frac{3e^2}{4\pi\varepsilon_0 r}$

2. Which of the following are isobars?

(i) Atom, whose nucleus contains 20p + 15n.

(ii) Atom, whose nucleus contains 20p + 20n.

(iii) Atom, whose nucleus contains 18p + 17n.

(iv) Atom, whose nucleus contains 18p + 22n.

(A) (i) and (iii) (B) (ii) and (iii)

(C) (iii) and (iv) (D) (i) and (iv)

3. Which of the following are isoelectronic?

(I) CH_3^+ (II) H_3O^+ (III) NH_3 (IV) CH_3^-

(A) I and III

(B) III and IV

(C) I and II

(D) II, III and IV

4. The wavenumber of the spectral line of shortest wavelength of Balmer series of He^+ ion is : (R = Rydberg's constant)

(A) R (B) 3R

(C) 4R (D) $\frac{4R}{9}$

5. If λ_1 and λ_2 are respectively the wavelengths of the series limit of Lyman and Balmer series of Hydrogen atom, then the wavelength of the first line of the Lyman series of the H-atom is :

(A) $\lambda_1 - \lambda_2$ (B) $\sqrt{\lambda_1\lambda_2}$

(C) $\frac{\lambda_2 - \lambda_1}{\lambda_1\lambda_2}$ (D) $\frac{\lambda_1\lambda_2}{\lambda_2 - \lambda_1}$

6. Which of the following ion will have maximum deflection under given electrical field?

(A) H^+ (B) Li^{3+} (C) He^+ (D) F^-

7. The total number of subshells in n^{th} main energy level are

(A) n^2 (B) $2n^2$

(C) (n – 1) (D) n

8. The electromagnetic radiation having correct order of the property indicated is

(A) Energy : X-rays > UV-rays

(B) Frequency : Micro wave > Infra red

(C) Wavelength : Short (radio) waves > Long (radio) waves

(D) Wave number : Gamma rays > Cosmic rays

9. In which of the following is the radius of the first orbit minimum?

(A) A hydrogen atom

(B) A tritium atom

(C) Triply ionized beryllium

(D) Double ionized helium

10. Uncertainty in the position of an electron (mass = 9.1×10^{-31} kg) moving with a velocity 300 m/s accurate up to 0.001% will be :

(A) 5.76×10^{-3} m (B) 1.92×10^{-2} m

(C) 3.84×10^{-3} m (D) 19.2×10^{-4} m

11. For which of the following species, Bohr model is not valid?

(A) He^{+} (B) H

(C) Li^{2+} (D) Mg^{2+}

12. Wavelength of radiations emitted when an electron in a H-like atom jumps from a state A to C is $2000\overset{o}{A}$ and it is $6000\overset{o}{A}$, when the electron jumps from state B to state C. Wavelength of the radiations emitted when an electron jumps from state A to B will be

(A) $2000\overset{o}{A}$ (B) $3000\ \overset{o}{A}$

(C) $4000\overset{o}{A}$ (D) $6000\overset{o}{A}$

13. If the radius of the first Bohr orbit of the H-atom is r, then for Li^{2+} ion, it will be

(A) 3r (B) 9r (C) $\frac{r}{3}$ (D) $\frac{r}{9}$

14. In a certain electronic transition in the Hydrogen atom from an initial state i to a final state f, the difference in the orbit radius (r_i _ r_f) is seven times the first Bohr radius. Identify the transition

(A) $4 \longrightarrow 1$ (B) $4 \longrightarrow 2$

(C) $4 \longrightarrow 3$ (D) $3 \longrightarrow 1$

15. The velocity of electron in the ground state of H atom is 2.184×10^8 cm/sec. The velocity of electron in the second orbit of Li^{2+} ion in cm/sec would be

(A) 3.276×10^8 (B) 2.185×10^8

(C) 4.91×10^8 (D) 1.638×10^8

16. If the angular momentum of an electron in a Bohr orbit is $\frac{2h}{\pi}$, then the value of potential energy of this electron present in He^{+} ion is

(A) –13.6 eV (B) –3.4 eV

(C) –6.8 eV (D) –27.2 eV

17. The ratio of the energy of a photon of wavelength $3000\overset{o}{A}$ to that of a photon of wavelength $6000\overset{o}{A}$ respectively is

(A) 1 : 2 (B) 2 : 1

(C) 3 : 1 (D) 1 : 3

18. A certain dye absorbs light of certain wavelength and then fluorescence light of wavelength $5000\overset{o}{A}$. Assuming that under given conditions, 50% of the absorbed energy is re-emitted out as fluorescence and the ratio of number of quanta emitted out to the number of quanta absorbed is 5 : 8, find the wavelength of absorbed light (in $\overset{o}{A}$). (hc = 12400 eV $\overset{o}{A}$)

(A) $4000\overset{o}{A}$ (B) $3000\overset{o}{A}$

(C) $2000\overset{o}{A}$ (D) $1000\overset{o}{A}$

19. Determine the de-Broglie wavelength associated with an electron in the 3rd Bohr's orbit of He^{+} ion

(A) $10\overset{o}{A}$ (B) $2\overset{o}{A}$

(C) $5\overset{o}{A}$ (D) $1\overset{o}{A}$

20. If the radius of first Bohr's orbit of H-atom is x, which of the following is the **CORRECT** conclusion about the de-Broglie wavelength of electron in 3rd Borh orbit of H?

(A) $2\pi x$ (B) $3\pi x$

(C) $\frac{3}{2}\pi x$ (D) $6\pi x$

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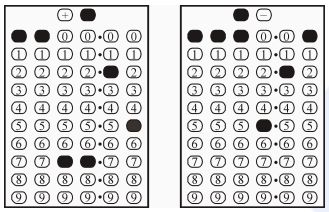

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1. The total number of isoelectronic species from the given set is ___.

O^{2-}, F^-, Al, Mg^{2+}, Na^+, O^+, Mg, Al^{3+}, F

2. The orbital angular momentum of an electron in 3s orbital is $\frac{xh}{2\pi}$. The value of x is ___. (Nearest Integer)

3. Values of work function (W) for a few metals are given below :

Metal	Li	Na	K	Mg	Cu	As	Be
W/eV	2.42	2.3	2.25	3.7	4.8	4.3	4.98

The number of metals which will show photoelectric effect when light of wavelength 400 nm falls on it is ___.

(Given: h = 6.6×10^{-34} Js, c = 3×10^8m/s, e = 1.6×10^{-19}c)

4. What will be the radius (in femtometer) of the nucleus of $_{13}Al^{27}$? (Nearest Integer)

5. The wavelength of an electron of kinetic 4.50×10^{-29}J is ___ $\times 10^{-5}$ m. (Nearest Integer) (Given : mass of electron is 9×10^{-31} kg, h =6.6×10^{-34} Js)

6. If the charge on proton and electron is reduced to 8×10^{-20} coulombs, the new value of Rydberg's constant charges from R to $\frac{R}{x}$. Then the value of x is ___.

7. The accelerating potential (V) that must be imparted to a proton beam to give it an effective wavelength of 0.1Å is ___. (the closest whole number value, charge of e^- = 1.6×10^{-19}C) (Nearest Integer)

8. A transition to the ground state in hydrogen spectrum has the same wavelength as Balmer transition n = 4, n = 2 of He^+ spectrum. The higher orbit number in transition occurring in H-atom is___.

9. Using arbitrary energy units we can calculate that 864 a.u are required to transfer an electron in hydrogen atom from the most stable Bohr's orbit to the largest distance from the nucleus N = ∞, E = 0 and N = 1, E = –864 a.u. The energy required (in a.u) to transfer the electron from 3rd Bohr's orbit to the orbit n = ∞ will be :

10. If an excited H-atom emission spectrum contains ten emission lines, the highest orbit in which the electron expected to be found is ___.

SECTION-I : (Maximum Marks: 80)

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1. Sum of first twenty terms of the series 1+(1 + 2) + (1+2+3)+.... is

(A) 210 (B) 1410

(C) 1305 (D) 1540

2. In the following two A.P's how many terms are identical?

2, 5, 8, 11,.... to 60 terms

3, 5, 7, 9,.... to 50 terms

(A) 16 (B) 17 (C) 18 (D) 20

3. The ratio of the sum of n-terms of two A.P's is (3n – 13) : (5n + 21). The ratio of 24^{th} terms of the two progression is

(A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) $\frac{3}{5}$ (D) $\frac{7}{11}$

4. If a_1, a_2, a_3....., an are in A.P where $a_i > 0$ for all i, then $\frac{1}{\sqrt{a_1}+\sqrt{a_2}} + \frac{1}{\sqrt{a_2}+\sqrt{a_3}} + \ldots + \frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}} =$

(A) $\frac{n}{\sqrt{a_1}+\sqrt{a_n}}$ (B) $\frac{n+1}{\sqrt{a_1}+\sqrt{a_n}}$

(C) $\frac{n-1}{\sqrt{a_1}+\sqrt{a_n}}$ (D) None of these

5. Which of the following is incorrect?

(A) $0.\overline{125} = \frac{125}{999}$ (B) $0.\overline{235} = \frac{233}{990}$

(C) $3.\overline{14} = \frac{22}{7}$ (D) All are correct

6. The sum to n-terms of the series 2 + 5 + 14 + 41 +.... is

(A) $3^{n-1} + 8n - 3$ (B) $8.3^n + 4n - 8$

(C) $3^{n+1} + \frac{8}{3}n + 1$ (D) None of these

7. Number of real solutions of the equation $\sqrt{\log_{10}(-x)} = \log_{10}\sqrt{x^2}$ is

(A) Exactly 1 (B) Exactly 2

(C) 4 (D) None

8. If $3^{2\log_3 x} - 2x - 3 = 0$, then the number of values of 'x' satisfying the equation is

(A) 0 (B) 1

(C) 2 (D) More than 2

9. The solution set of the inequality $(x-1)(x-2)(x-3)(x-4) \geq 0$ is

(A) $(-\infty, 2) \cup (4, \infty)$

(B) $[1, 2] \cup [3, 4]$

(C) $(-\infty, 2] \cup [3, 4]$

(D) $(-\infty, 1] \cup [2, 3] \cup [4, \infty)$

10. The set of real values of x satisfying $|x-1| \leq 3$ and $|x-1| \geq 1$ is

(A) [2, 4]

(B) $(-\infty, 2] \cup [4, \infty)$

(C) $[-2, 0] \cup [2, 4]$

(D) None of these

11. The equation $\log_3(3^x - 8) = 2 - x$, has the solution for

(A) x = 1 (B) x = 2

(C) x = 3 (D) x = 4

12. **Solve:** $||x-1|+2| \le 4$.

(A) $x \in [-1, 3)$ (B) $x \in [-1, 3]$

(C) $x \in [2, 3]$ (D) $x \in (2, 3)$

13. Let $x = 1 + a + a^2 + \ldots$ to ∞ and $y = 1 + b + b^2 + \ldots$ to ∞. If $1 + ab + a^2b^2 + \ldots$ to $\infty = S$. Then $S =$

(A) $x + y$

(B) xy

(C) $\dfrac{x+y}{xy-1}$

(D) $\dfrac{xy}{x+y-1}$
$[0 < a < 1, 0 < b < 1]$

14. If $(x + 1)$, $3x$ and $(4x + 2)$ are first three terms of an A.P, then its 5^{th} term is

(A) 14 (B) 19

(C) 24 (D) 28

15. Let $A_1, A_2, A_3, \ldots A_{10}$ are 10 arithmetic mean between 1 and 10 then the value of sum of $A_1 + A_2 + A_3 \ldots A_{10}$.

(A) 25 (B) 45

(C) 55 (D) 65

16. The number of solution of $\log_4(x-1) = \log_2(x-3)$ is

(A) 0 (B) 1

(C) 2 (D) 3

17. The value of $3 + \dfrac{1}{4 + \dfrac{1}{3 + \dfrac{1}{4 + \dfrac{1}{3 + \ldots \infty}}}}$ is equal to

(A) $1.5 + \sqrt{3}$ (B) $2 + \sqrt{3}$

(C) $3 + 2\sqrt{3}$ (D) $4 + \sqrt{3}$

18. If $8 = 3 + \dfrac{1}{4}(3 + p) + \dfrac{1}{4^2}(3 + 2p) + \dfrac{1}{4^3}(3 + 3p) + \ldots \infty$, then the value of p is

(A) 3 (B) 6

(C) 9 (D) 12

19. Let $a_1, a_2, a_3, \ldots$ be in A.P. If $a_7 = 3$, the product a_1a_4 is minimum and the sum of its first n-terms is zero, then $n! - 4a_{n(n+2)}$ is equal to

(A) 24 (B) $\dfrac{33}{4}$

(C) 9 (D) $\dfrac{381}{4}$

20. If $a_1, a_2, a_3 \ldots$ and $b_1, b_2, b_3 \ldots$ are A.P and $a_1 = 2$, $a_{10} = 3$, $a_1b_1 = 1 = a_{10}b_{10}$, then a_4b_4 is equal to

(A) 1 (B) $\dfrac{35}{27}$

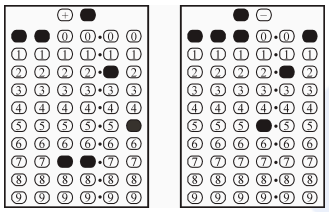
(C) $\dfrac{28}{27}$ (D) $\dfrac{27}{28}$

SECTION-II : (Maximum Marks: 20)

This section contains 10 questions Candidates have to attempt any 5 questions out of 10. If more than 5 questions are attempted, then only first 5 attempted questions will be evaluated.

The answer to each question is a **Numerical Value** Type questions.

For each question, enter the correct numerical value (in decimal notation, truncated/rounded off to the second decimal place; 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 correct answer is entered.

Zero Marks : 0 If the question is unanswered.

Negative Marks : –1 If wrong answer is entered.

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1. The value of $0.16^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots\infty\right)}$ is equal to ___.

2. The number of real solutions of the equation $x(x^2 + 3|x| + 5|x-1|+6|x-2|) = 0$ is ___.

3. If $\frac{1^3 + 2^3 + 3^3+\ldots\text{upto n terms}}{1.3 + 2.5 + 3.7+\ldots\text{upto n terms}} = \frac{9}{5}$, then the value of n is ___.

4. For the two positive numbers a, b if a, b and $\frac{1}{18}$ are in a G.P, while $\frac{1}{a}$, 10 and $\frac{1}{b}$ are in A.P, then 16a + 12b is equal to ___.

5. If sum of the first 21 terms of series $\log_{9^{1/2}}x + \log_{9^{1/3}}x + \log_{9^{1/4}}x+\ldots$, where $x > 0$ is 504, then the value of x is equal to ___.

6. Find the number of roots of the equation $|x| + |x - 2| = 5$, $x \in R$.

7. If $x - \frac{1}{x} = 3$, then the value of the expression $2\left(x^3 - \frac{1}{x^3}\right) - 3\left(x^2 + \frac{1}{x^2}\right) - 39$.

8. Find the value of x, if $\log_3(x + 1) + \log_3(x + 3) = 1$.

9. Find the value of x, if $\log_2\log_4\log_5 x = 0$.

10. If 7 times the 7^{th} term of an A.P is equal to 11 times its 11^{th} term, then the 18^{th} term of the A.P is ___.

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