

UNIVERSITY OF LUCKNOW

UNDERGRADUATE ENTRANCE TEST (UGET) - B.Sc. (MATHEMATICS) 2026

लखनऊ विश्वविद्यालय - स्नातक प्रवेश परीक्षा - बी.एस-सी. (गणित) 2026

MODEL PAPER - SET 14 / प्रतिदर्श प्रश्नपत्र - सेट 14

General Instructions: All questions are compulsory. Each question carries 2 marks. Only one option is correct.

सामान्य निर्देश: सभी प्रश्न अनिवार्य हैं। प्रत्येक प्रश्न 2 अंक का है। केवल एक विकल्प सही है।

SECTION A - MATHEMATICS / खण्ड A - गणित

1. The derivative of function is ?

फलन का अवकलज क्या दर्शाता है ?

- (1) order / कोटि
- (2) range / परास
- (3) slope / ढाल
- (4) rate of change / परिवर्तन की दर

Correct Answer / सही उत्तर : (4) rate of change / परिवर्तन की दर

Solution / हल : The derivative gives the rate of change of a function. | अवकलज फलन के परिवर्तन की दर देता है।

2. The following sentences are steps involved in finding the H.C.F. of 29 and 24 by using Euclid's Division algorithm. Arrange them in sequential order from first to last (A) 5=1 ?

29 व 24 का H.C.F. यूक्लिड विभाजन एल्गोरिथ्म से ज्ञात करने के चरणों को सही क्रम में रखिए ?

- (1) C, A, B / C, A, B
- (2) B, A, C / B, A, C
- (3) A, B, C / A, B, C
- (4) B, C, A / B, C, A

Correct Answer / सही उत्तर : (4) B, C, A / B, C, A

Solution / हल : Euclid's algorithm steps in order: B, C, A. | यूक्लिड एल्गोरिथ्म के चरण क्रम में: B, C, A

3. If a, b, c, x, y, z are the real numbers such that $a^2 + b^2 + c^2 = 1$, $x^2 + y^2 + z^2 = 1$, then $ax + by + cz$?
यदि $a^2 + b^2 + c^2 = 1$ व $x^2 + y^2 + z^2 = 1$, तो $ax + by + cz$ का मान ?

- (1) Less than or equal to 1 / 1 से कम या बराबर
- (2) Greater than or equal to 1 / 1 से अधिक या बराबर
- (3) Greater than or equal to 3 / 3 से अधिक या बराबर
- (4) Less than or equal to 3 / 3 से कम या बराबर

Correct Answer / सही उत्तर : (1) Less than or equal to 1 / 1 से कम या बराबर

Solution / हल : By Cauchy-Schwarz, $ax + by + cz \leq 1$. | कौशी-श्वार्ज से $ax + by + cz \leq 1$

4. The function f define by $f(x) = \{x^2 + 3x + a, \text{ if } x \leq 1$?

फलन $f(x) = \{x^2 + 3x + a, \text{ यदि } x \leq 1; bx + 2, \text{ यदि } x > 1\}$ संतत हो तो a, b ?

- (1) a = 3, b = 5 / a = 3, b = 5
- (2) a = 5, b = 3 / a = 5, b = 3
- (3) a = 3, b = 0 / a = 3, b = 0
- (4) a / a

Correct Answer / सही उत्तर : (1) a = 3, b = 5 / a = 3, b = 5

Solution / हल : For continuity at $x=1$: $a=3, b=5$. | $x=1$ पर संततता हेतु: $a=3, b=5$

5. If T is compact, then T is ?

यदि T संहत (compact) है, तो T कैसा है ?

- (1) Closed and bounded / संवृत व परिबद्ध
- (2) Unbounded and open / अपरिबद्ध व विवृत

- (3) Bounded and open / परिबद्ध व विवृत
(4) Closed and unbounded / संवृत व अपरिबद्ध

Correct Answer / सही उत्तर : (1) Closed and bounded / संवृत व परिबद्ध

Solution / हल : A compact set (in a metric space) is closed and bounded. | संवृत समुच्चय (मेट्रिक समष्टि में) संवृत व परिबद्ध होता है।

6. In a metric space (X, d) , A be a metric space, A^c then the largest open subset of (complement of A) is ?
मेट्रिक समष्टि (X, d) में, A^c (A का संपूरक) का सबसे बड़ा विवृत उपसमुच्चय क्या है ?

- (1) Boundary of A / A की सीमा
(2) Closure of A / A का संवरण
(3) Exterior of A / A का बाह्यभाग
(4) Interior of A / A का अंतःभाग

Correct Answer / सही उत्तर : (3) Exterior of A / A का बाह्यभाग

Solution / हल : The largest open subset of A^c is the exterior of A . | A^c का सबसे बड़ा विवृत उपसमुच्चय A का बाह्यभाग है।

7. A set G with one binary operation which is closed as well as associative is called?
एक द्विआधारी संक्रिया वाला समुच्चय G जो संवृत व साहचर्य हो, क्या कहलाता है ?

- (1) semigroup / अर्धसमूह (semigroup)
(2) groupoid / groupoid
(3) group / समूह
(4) monoid / एकाभ (monoid)

Correct Answer / सही उत्तर : (1) semigroup / अर्धसमूह (semigroup)

Solution / हल : A closed, associative set with one binary operation is a semigroup. | संवृत व साहचर्य, एक द्विआधारी संक्रिया वाला समुच्चय अर्धसमूह है।

8. If R is the position vector, then $\text{div}R$ is equal to ?
यदि R स्थिति सदिश है, तो $\text{div} R$ किसके बराबर है ?

- (1) 4 / 4 : 1
(2) 3 / 3 : 1
(3) 1 / 1 : 1
(4) 2 / 2 : 1

Correct Answer / सही उत्तर : (2) 3 / 3 : 1

Solution / हल : $\text{div} R = \nabla \cdot R = 3$ (for position vector in 3D). | $\text{div} R = \nabla \cdot R = 3$ (स्थिति सदिश, 3D)।

9. Find the middle term of A.P. if it is given that sum of three numbers in A.P. is 15?
यदि A.P. के तीन पदों का योग 15 है, तो मध्य पद ज्ञात कीजिए ?

- (1) 20 / 20
(2) 15 / 15%
(3) 10 / 1, 0
(4) 5 / 5

Correct Answer / सही उत्तर : (4) 5 / 5

Solution / हल : Sum of 3 terms of an A.P. = 15 \Rightarrow middle term = $15/3 = 5$. | A.P. के 3 पदों का योग 15 = मध्य पद = $15/3 = 5$

10. The order of 2 modulo 101 is ?

2 का 101 के सापेक्ष (modulo 101) कोटि (order) क्या है ?

- (1) 100 / 100
(2) 99 / 99
(3) 98 / 98
(4) 97 / 97

Correct Answer / सही उत्तर : (1) 100 / 100

Solution / हल : The order of 2 modulo 101 is 100. | 2 का 101 के सापेक्ष कोटि 100 है।

11. If f and g are Riemann integrable on $[a, b]$, then which of the following property doesn't hold ?
यदि f व g $[a, b]$ पर रीमान समाकलनीय हैं, तो कौन-सा गुण नहीं रखता ?

- (1) f^2 is R-integrable / f^2 R-समाकलनीय है
- (2) $\max\{f, g\}$ is R-integrable / $\max\{f, g\}$ R-समाकलनीय है
- (3) $\min\{f, g\}$ is R-integrable / $\min\{f, g\}$ R-समाकलनीय है
- (4) f is not R-integrable / f R-समाकलनीय नहीं है

Correct Answer / सही उत्तर : (4) f is not R-integrable / f R-समाकलनीय नहीं है

Solution / हल : f is integrable; ' f is not R-integrable' does not hold. | f समाकलनीय है; ' f R-समाकलनीय नहीं' नहीं रखता।

12. Find the gradient of the scalar field if $f(x, y) = x + y$ at $(1, 2)$?

यदि $f(x, y) = x + y$ हो, तो $(1, 2)$ पर अदिश क्षेत्र की प्रवणता (gradient) ज्ञात कीजिए ?

- (1) $i + 2j$ / $i + 2j$
- (2) $i + j$ / $i + j$
- (3) j / j
- (4) $j + 2i$ / $j + 2i$

Correct Answer / सही उत्तर : (2) $i + j$ / $i + j$

Solution / हल : $\text{grad}(x+y) = i + j$. | $\text{grad}(x+y) = i + j$

13. What is the limit point of the sequence $\langle f \rangle = 1$?

अनुक्रम $\langle f \rangle = 1$ का सीमा बिंदु क्या है ?

- (1) 2 / 2 : 1
- (2) 0 / 0
- (3) 1 / 1 : 1
- (4) ∞ / ∞

Correct Answer / सही उत्तर : (3) 1 / 1 : 1

Solution / हल : The limit point of the constant sequence $\langle 1 \rangle$ is 1 . | अचर अनुक्रम $\langle 1 \rangle$ का सीमा बिंदु 1 है।

14. If $b = c = 0$ in the equation $ax^2 + bx + c = 0$, then the value of roots are ?

यदि समीकरण $ax^2 + bx + c = 0$ में $b = c = 0$, तो मूलों का मान ?

- (1) $0, 1$ / $0, 1$
- (2) $1, 0$ / $1, 0$
- (3) $1, 1$ / $1, 1$
- (4) $0, 0$ / $0, 0$

Correct Answer / सही उत्तर : (4) $0, 0$ / $0, 0$

Solution / हल : With $b=c=0$, $ax^2=0 \Rightarrow$ roots are $0, 0$. | $b=c=0$ पर $ax^2=0 =$ मूल $0, 0$ ।

15. The divergence of a vector field A is always equal to zero if the vector field A can be expressed as?

सदिश क्षेत्र A का अपसरण (divergence) सदैव शून्य होगा यदि A को किस रूप में व्यक्त किया जा सके ?

- (1) the divergence of vector field / सदिश क्षेत्र का अपसरण
- (2) divergence of any scalar field / किसी अदिश क्षेत्र का अपसरण
- (3) gradient of any scalar field (cid:2) / किसी अदिश क्षेत्र की प्रवणता
- (4) the curl of any vector field / किसी सदिश क्षेत्र का कर्ल

Correct Answer / सही उत्तर : (4) the curl of any vector field / किसी सदिश क्षेत्र का कर्ल

Solution / हल : $\text{div } A = 0$ if $A = \text{curl of some vector field}$. | $\text{div } A = 0$ यदि $A =$ किसी सदिश क्षेत्र का कर्ल हो।

16. If A is skew symmetric matrix, then A^2 is a ?

If A is skew symmetric matrix, then A^2 is a ?

- (1) Skew / Skew
- (2) Symmetric / Symmetric

(3) Unitary matrix / Unitary matrix

(4) Null matrix / Null matrix

Correct Answer / सही उत्तर : (2) Symmetric / Symmetric

Solution / हल : Correct option: Symmetric | सही विकल्प: Symmetric

17. Asymptotes are the tangents to the curve at which point?

Asymptotes are the tangents to the curve at which point?

(1) One point / One point

(2) Infinite / Infinite

(3) Three points / Three points

(4) Two points / Two points

Correct Answer / सही उत्तर : (2) Infinite / Infinite

Solution / हल : Correct option: Infinite | सही विकल्प: Infinite

18. Inner product spaces over the field of complex numbers are sometimes to as ?

Inner product spaces over the field of complex numbers are sometimes to as ?

(1) unitary space / unitary space

(2) vector space / vector space

(3) real vector space / real vector space

(4) abstract vector space / abstract vector space

Correct Answer / सही उत्तर : (1) unitary space / unitary space

Solution / हल : Correct option: unitary space | सही विकल्प: unitary space

19. Let (X, d) be a metric space and E is contained in X , E is called nowhere dense set if _____ ?

Let (X, d) be a metric space and E is contained in X , E is called nowhere dense set if _____ ?

(1) closure of E is not defined / closure of E is not defined

(2) closure of E is empty / closure of E is empty

(3) closure of E is finite / closure of E is finite

(4) closure of E terminate after some steps / closure of E terminate after some steps

Correct Answer / सही उत्तर : (2) closure of E is empty / closure of E is empty

Solution / हल : Correct option: closure of E is empty | सही विकल्प: closure of E is empty

20. For the following distribution: Class 0 -5 5 -10 10 -15 15 -20 20- 25 Frequency 10 15 12 20 9 The sum of lower limits of the median class and modal class is ?

For the following distribution: Class 0 -5 5 -10 10 -15 15 -20 20- 25 Frequency 10 15 12 20 9

The sum of lower limits of the median class and modal class is ?

(1) 30 / 30

(2) 15 / 15%

(3) 35 / 3.5%

(4) 25 / $< 2, 5 >$

Correct Answer / सही उत्तर : (4) 25 / $< 2, 5 >$

Solution / हल : Correct option: 25 | सही विकल्प: $< 2, 5 >$

21. The points of discontinuity of the function $f(x) = \log|x|$ is ?

The points of discontinuity of the function $f(x) = \log|x|$ is ?

(1) 1 / 1 : 1

(2) 4 / 4 : 1

(3) 31 / 31%

(4) 2 / 2 : 1

Correct Answer / सही उत्तर : (1) 1 / 1 : 1

Solution / हल : Correct option: 1 | सही विकल्प: 1 : 1

22. How many cards must be picked from a standard pack of 52 cards to surely get 2 cards of the same suit?

How many cards must be picked from a standard pack of 52 cards to surely get 2 cards of the same suit?

- (1) 2 / 2 : 1
- (2) 5 / 5
- (3) 4 / 4 : 1
- (4) 3 / 3 : 1

Correct Answer / सही उत्तर : (2) 5 / 5

Solution / हल : Correct option: 5 | सही विकल्प: 5

23. Which of the following metric space is not complete?

Which of the following metric space is not complete?

- (1) set of irrationals / set of irrationals
- (2) set of real numbers / set of real numbers
- (3) set of rationals / set of rationals
- (4) set of complex numbers / set of complex numbers

Correct Answer / सही उत्तर : (3) set of rationals / set of rationals

Solution / हल : Correct option: set of rationals | सही विकल्प: set of rationals

24. Find the value of $f(x, y) = 8x + 5y$?

Find the value of $f(x, y) = 8x + 5y$?

- (1) 11 / 1, 1
- (2) 12 / 12%
- (3) 13 / 13
- (4) 14 / 14%

Correct Answer / सही उत्तर : (1) 11 / 1, 1

Solution / हल : Correct option: 11 | सही विकल्प: 1, 1

25. The reflection of the complex number in $1+2i$ the straight line $iz = z$ is $4+3i$ efce ?

The reflection of the complex number in $1+2i$ the straight line $iz = z$ is $4+3i$ efce ?

- (1) $2+i$ these / $2+i$ these
- (2) 4 / 4 : 1
- (3) 1 / 1 : 1
- (4) none of / none of

Correct Answer / सही उत्तर : (3) 1 / 1 : 1

Solution / हल : Correct option: 1 | सही विकल्प: 1 : 1

26. If the median of the distribution given below is 28.5, Class: 0 ?

If the median of the distribution given below is 28.5, Class: 0 ?

- (1) 8, 5 / 8, 5
- (2) 8, 7 / 8, 7
- (3) 2, 5 / $< 2, 5 >$
- (4) 3, 7 / 3, 7

Correct Answer / सही उत्तर : (2) 8, 7 / 8, 7

Solution / हल : Correct option: 8, 7 | सही विकल्प: 8, 7

27. The number of factors and their sum of 360 are ?

The number of factors and their sum of 360 are ?

- (1) 12 & 810 / 12 & 810
- (2) 24 & 1080 / 24 & 1080
- (3) 24 & 1170 / 24 & 1170
- (4) 12 & 540 / 12 & 540

Correct Answer / सही उत्तर : (3) 24 & 1170 / 24 & 1170

Solution / हल : Correct option: 24 & 1170 | सही विकल्प: 24 & 1170

28. The measure of the central tendency is given by the X-coordinate of the point of intersection of the more than ogive and less than ogive is ?

The measure of the central tendency is given by the X-coordinate of the point of intersection of the more than ogive and less than ogive is ?

- (1) Mean / Mean
- (2) Median / Median
- (3) All the above / All the above
- (4) Mode / Mode

Correct Answer / सही उत्तर : (2) Median / Median

Solution / हल : Correct option: Median | सही विकल्प: Median

29. The rank of a matrix in echelon form is equal to ?

The rank of a matrix in echelon form is equal to ?

- (1) Order of matrix / Order of matrix
- (2) Number of non zero rows of the matrix / Number of non zero rows of the matrix
- (3) Number of zero rows of the matrix / Number of zero rows of the matrix
- (4) Number of variables / Number of variables

Correct Answer / सही उत्तर : (2) Number of non zero rows of the matrix / Number of non zero rows of the matrix

Solution / हल : Correct option: Number of non zero rows of the matrix | सही विकल्प: Number of non zero rows of the matrix

30. The number of elements in the set $S = \{(a, b) | 2a^2 + 3b^2 = 35 : a, b \text{ are integers}\}$ is $2a^2 + 3b^2$ है ?

The number of elements in the set $S = \{(a, b) | 2a^2 + 3b^2 = 35 : a, b \text{ are integers}\}$ is $2a^2 + 3b^2$ है ?

- (1) 12 / 12%
- (2) 4 / 4 : 1
- (3) 8 / 8
- (4) 2 / 2 : 1

Correct Answer / सही उत्तर : (3) 8 / 8

Solution / हल : Correct option: 8 | सही विकल्प: 8

31. The spin field or rotation field or turning field goes around the origin instead of away from it. The field is S. if S is perpendicular to R then their dot product is ?

The spin field or rotation field or turning field goes around the origin instead of away from it. The field is S. if S is perpendicular to R then their dot product is ?

- (1) 1 (cid:1)(cid:2) (cid:1)(cid:2) / 1 (cid:1)(cid:2) (cid:1)(cid:2)
- (2) infinite / infinite
- (3) not defined / अपरिभाषित
- (4) 0 / 0

Correct Answer / सही उत्तर : (4) 0 / 0

Solution / हल : Correct option: 0 | सही विकल्प: 0

32. If n and m are natural numbers then the equation. (Z ?

If n and m are natural numbers then the equation. (Z ?

- (1) Have more than two common solution / Have more than two common solution
- (2) Have two common solution / Have two common solution
- (3) Have no common solution / Have no common solution
- (4) Have one common solution / Have one common solution

Correct Answer / सही उत्तर : (3) Have no common solution / Have no common solution

Solution / हल : Correct option: Have no common solution | सही विकल्प: Have no common solution

33. How many diagonals are there in polygon of 15 sides?
How many diagonals are there in polygon of 15 sides?

- (1) 120 / 120
- (2) 105 / 10.5%
- (3) 135 / 135
- (4) 90 / 90

Correct Answer / सही उत्तर : (4) 90 / 90

Solution / हल : Correct option: 90 | सही विकल्प: 90

34. The polynomial $f(x) = x^4 + x^2 + 1$ is $f(x) = x^4 + x^2 + 1$?
The polynomial $f(x) = x^4 + x^2 + 1$ is $f(x) = x^4 + x^2 + 1$?

- (1) reducible over the field F of five / reducible over the field F of five
- (2) reducible over the field of real numbers / reducible over the field of real numbers
- (3) none of these / इनमें कोई नहीं
- (4) irreducible over ring of integers / irreducible over ring of integers

Correct Answer / सही उत्तर : (1) reducible over the field F of five / reducible over the field F of five

Solution / हल : Correct option: reducible over the field F of five | सही विकल्प: reducible over the field F of five

35. What is the order of a 7-Sylow subgroup of $GL^3(\mathbb{Z}_7)$?
What is the order of a 7-Sylow subgroup of $GL^3(\mathbb{Z}_7)$?

- (1) 49 / 49%
- (2) 343 7-Sylow / 343 7-Sylow
- (3) 1 / 1 : 1
- (4) 7 / 7

Correct Answer / सही उत्तर : (2) 343 7-Sylow / 343 7-Sylow

Solution / हल : Correct option: 343 7-Sylow | सही विकल्प: 343 7-Sylow

36. If we are given two overlapping sets A and B in metric space then what can we say about $d(A, B)$?
If we are given two overlapping sets A and B in metric space then what can we say about $d(A, B)$?

- (1) finite / finite
- (2) doesn't exist / doesn't exist
- (3) zero / शून्य
- (4) ∞ / ∞

Correct Answer / सही उत्तर : (3) zero / शून्य

Solution / हल : Correct option: zero | सही विकल्प: शून्य

37. Which function defined on \mathbb{R} by $f(x) = x$ for every x in \mathbb{R} , is continuous in \mathbb{R} ?
Which function defined on \mathbb{R} by $f(x) = x$ for every x in \mathbb{R} , is continuous in \mathbb{R} ?

- (1) Identity function / Identity function
- (2) Riemann function / Riemann function
- (3) Dirichlet function / Dirichlet function
- (4) Constant function / Constant function

Correct Answer / सही उत्तर : (1) Identity function / Identity function

Solution / हल : Correct option: Identity function | सही विकल्प: Identity function

38. The intersection of finitely many open sets is ?
The intersection of finitely many open sets is ?

- (1) closed, open / closed, open
- (2) Open, closed / Open, closed
- (3) Open, open / Open, open

(4) Closed, closed / Closed, closed

Correct Answer / सही उत्तर : (2) Open, closed / Open, closed

Solution / हल : Correct option: Open, closed | सही विकल्प: Open, closed

39. The triangle formed by the points 1, i , i^2 as vertices in the Argand diagram is ?

The triangle formed by the points 1, i , i^2 as vertices in the Argand diagram is ?

(1) right-angled / right-angled

(2) equilateral / equilateral

(3) isosceles / isosceles

(4) scalene / scalene

Correct Answer / सही उत्तर : (3) isosceles / isosceles

Solution / हल : Correct option: isosceles | सही विकल्प: isosceles

40. In a class of 60 students, 25 students play cricket and 20 students play tennis and 10 students play both the games, then the number of students who play neither is ?

In a class of 60 students, 25 students play cricket and 20 students play tennis and 10 students play both the games, then the number of students who play neither is ?

(1) 25 / $< 2, 5 >$

(2) 35 / 3.5%

(3) 45 / 45

(4) 0 / 0

Correct Answer / सही उत्तर : (1) 25 / $< 2, 5 >$

Solution / हल : Correct option: 25 | सही विकल्प: $< 2, 5 >$

SECTION B - PHYSICS / खण्ड B - भौतिक विज्ञान

41. The volume of hollow hall is 2000 m^3 and total absorption coefficient is 165 unit. Then reverberation time of hall is ?

The volume of hollow hall is 2000 m^3 and total absorption coefficient is 165 unit. Then reverberation time of hall is ?

(1) 1s / 1s

(2) 4s / 4s

(3) 2s / 2s

(4) 0.5s / 0.5s

Correct Answer / सही उत्तर : (3) 2s / 2s

Solution / हल : Correct option: 2s | सही विकल्प: 2s

42. Three resistances of 12, 12 and 6 are connected in parallel. The equivalent resistance will be ?

Three resistances of 12, 12 and 6 are connected in parallel. The equivalent resistance will be ?

(1) 3 / 3 : 1

(2) 1 / 1 : 1

(3) 10 / 1, 0

(4) 9 / 9%

Correct Answer / सही उत्तर : (1) 3 / 3 : 1

Solution / हल : Correct option: 3 | सही विकल्प: 3 : 1

43. The ratio of the speeds of sound in nitrogen gas to that in helium gas at 300 K is ?

The ratio of the speeds of sound in nitrogen gas to that in helium gas at 300 K is ?

(1) 5 / 5

(2) 2/7 / 2/7

(3) 1/7 / 17

(4) 3/7 / 3/7

Correct Answer / सही उत्तर : (1) 5 / 5

Solution / हल : Correct option: 5 | सही विकल्प: 5

44. Efficiency of Carnot engine is 50% and its temperature of sink is 17°C . For 60% efficiency, the temperature of the sink will be ?

Efficiency of Carnot engine is 50% and its temperature of sink is 17°C . For 60% efficiency, the temperature of the sink will be ?

- (1) None of these / इनमें कोई नहीं
- (2) 800 K / 800 K
- (3) 750 K / 750 K
- (4) 650 K / 650 K

Correct Answer / सही उत्तर : (1) None of these / इनमें कोई नहीं

Solution / हल : Correct option: None of these | सही विकल्प: इनमें कोई नहीं

45. A He Ne laser produces coherent light at wave length ?

A He Ne laser produces coherent light at wave length ?

- (1) $0.5826 \mu\text{m}$ / $0.5826 \mu\text{m}$
- (2) $0.6328 \mu\text{m}$ / $0.6328 \mu\text{m}$
- (3) $10.630 \mu\text{m}$ / $10.630 \mu\text{m}$
- (4) $1.052 \mu\text{m}$ / $1.052 \mu\text{m}$

Correct Answer / सही उत्तर : (2) $0.6328 \mu\text{m}$ / $0.6328 \mu\text{m}$

Solution / हल : Correct option: $0.6328 \mu\text{m}$ | सही विकल्प: $0.6328 \mu\text{m}$

46. Best way to demonstrate temporal coherence is ?

Best way to demonstrate temporal coherence is ?

- (1) Newton's ring / Newton's ring
- (2) Michelson interferometer / Michelson interferometer
- (3) Fresnel biprism / Fresnel biprism
- (4) Fabry Perot interferometer / Fabry Perot interferometer

Correct Answer / सही उत्तर : (2) Michelson interferometer / Michelson interferometer

Solution / हल : Correct option: Michelson interferometer | सही विकल्प: Michelson interferometer

47. The bulk modulus of a metal is $3A$ and Poisson's ratio 0.20 if average intermolecular distance between the molecules is $3A$ then the inter atomic force constant will be ?

The bulk modulus of a metal is $3A$ and Poisson's ratio 0.20 if average intermolecular distance between the molecules is $3A$ then the inter atomic force constant will be ?

- (1) 7.5 N/m^2 / 7.5 N/m^2
- (2) 7.5 N/m / 7.5 N/m
- (3) 5.4 N/m / 5.4 N/m
- (4) 30 N/m / 30 N/m

Correct Answer / सही उत्तर : (3) 5.4 N/m / 5.4 N/m

Solution / हल : Correct option: 5.4 N/m | सही विकल्प: 5.4 N/m

48. Scalar quantity is ?

Scalar quantity is ?

- (1) temperature / ताप
- (2) displacement / displacement
- (3) velocity / velocity
- (4) momentum / momentum

Correct Answer / सही उत्तर : (1) temperature / ताप

Solution / हल : Correct option: temperature | सही विकल्प: ताप

49. In Michelson interferometer experiment, when mirror is moved from 2.3410 cm to 2.3260 cm, 500 fringes cross through the field of view. The wave length of light used is λ ?
In Michelson interferometer experiment, when mirror is moved from 2.3410 cm to 2.3260 cm, 500 fringes cross through the field of view. The wave length of light used is λ ?

- (1) 4350A / 4350A
- (2) 5500A λ / 5500A λ
- (3) 6000A / 6000A
- (4) 6300A / 6300A

Correct Answer / सही उत्तर : (3) 6000A / 6000A

Solution / हल : Correct option: 6000A | सही विकल्प: 6000A

50. $J = \sigma E$, where J is current density, σ is conductivity and E is electric field, is ?
 $J = \sigma E$, where J is current density, σ is conductivity and E is electric field, is ?

- (1) Ampere's law / Ampere's law
- (2) Continuity equation / Continuity equation
- (3) A form of Ohm's law / A form of Ohm's law
- (4) Maxwell's equation / Maxwell's equation

Correct Answer / सही उत्तर : (3) A form of Ohm's law / A form of Ohm's law

Solution / हल : Correct option: A form of Ohm's law | सही विकल्प: A form of Ohm's law

51. When a perfect gas is supposed to expand freely against vacuum in an insulated vessel, the gas undergoes ?

When a perfect gas is supposed to expand freely against vacuum in an insulated vessel, the gas undergoes ?

- (1) a change in pressure / a change in pressure
- (2) a change in phase / a change in phase
- (3) a change in temperature / a change in temperature
- (4) a change in pressure and phase both / a change in pressure and phase both

Correct Answer / सही उत्तर : (3) a change in temperature / a change in temperature

Solution / हल : Correct option: a change in temperature | सही विकल्प: a change in temperature

52. Two photons each with velocity c are moving in opposite direction. Their relative velocity will be ?
Two photons each with velocity c are moving in opposite direction. Their relative velocity will be ?

- (1) c / c
- (2) Zero / शून्य
- (3) None of these / इनमें कोई नहीं
- (4) 2 c / 2 c

Correct Answer / सही उत्तर : (1) c / c

Solution / हल : Correct option: c | सही विकल्प: c

53. With the decrease in the prism angle, the angular dispersion between red and violet rays ?
With the decrease in the prism angle, the angular dispersion between red and violet rays ?

- (1) Decreases / घटती (Decreases)
- (2) Increases / बढ़ता है
- (3) Does not change / Does not change
- (4) Depends on the incidence angle / Depends on the incidence angle

Correct Answer / सही उत्तर : (4) Depends on the incidence angle / Depends on the incidence angle

Solution / हल : Correct option: Depends on the incidence angle | सही विकल्प: Depends on the incidence angle

54. A bulb is stamped as 60 W/240 V. The resistance when lighted by 240 volt is ?
A bulb is stamped as 60 W/240 V. The resistance when lighted by 240 volt is ?

- (1) 960 ohm / 960 ohm
- (2) 480 ohm / 480 ohm
- (3) 560 ohm / 560 ohm
- (4) 240 ohm / 240 ohm

Correct Answer / सही उत्तर : (1) 960 ohm / 960 ohm

Solution / हल : Correct option: 960 ohm | सही विकल्प: 960 ohm

55. Which of the following has least surface area for a given volume?

Which of the following has least surface area for a given volume?

- (1) Cylinder / Cylinder
- (2) Sphere / Sphere
- (3) Cube / Cube
- (4) Cone / Cone

Correct Answer / सही उत्तर : (2) Sphere / Sphere

Solution / हल : Correct option: Sphere | सही विकल्प: Sphere

56. A tuning fork of frequency 260 Hz is vibrated with a sonometer wire and 5 beats are heard. If the tension in the wire is slightly increase, the beat frequency also decreases. The original frequency of the sonometer is ?

A tuning fork of frequency 260 Hz is vibrated with a sonometer wire and 5 beats are heard. If the tension in the wire is slightly increase, the beat frequency also decreases. The original frequency of the sonometer is ?

- (1) 265 Hz / 265 Hz
- (2) 255 Hz / 255 Hz
- (3) 250 Hz / 250 Hz
- (4) 260 Hz / 260 Hz

Correct Answer / सही उत्तर : (2) 255 Hz / 255 Hz

Solution / हल : Correct option: 255 Hz | सही विकल्प: 255 Hz

57. If 1.20 V potential difference must be applied to stop the fastest photoelectrons emitted by a nickel surface under the action of ultraviolet light of wavelength 2000, calculate the work function of nickel ?

If 1.20 V potential difference must be applied to stop the fastest photoelectrons emitted by a nickel surface under the action of ultraviolet light of wavelength 2000, calculate the work function of nickel ?

- (1) 4.80 eV / 4.80 eV
- (2) 6.21 eV / 6.21 eV
- (3) 5.01 eV / 5.01 eV
- (4) 4.50 eV / 4.50 eV

Correct Answer / सही उत्तर : (3) 5.01 eV / 5.01 eV

Solution / हल : Correct option: 5.01 eV | सही विकल्प: 5.01 eV

58. The first law of thermodynamics is a special case of ?

The first law of thermodynamics is a special case of ?

- (1) the law of heat exchange / the law of heat exchange
- (2) the law of conservation of energy / the law of conservation of energy
- (3) Charles' law / Charles' law
- (4) Newton's law / Newton's law

Correct Answer / सही उत्तर : (2) the law of conservation of energy / the law of conservation of energy

Solution / हल : Correct option: the law of conservation of energy | सही विकल्प: the law of conservation of energy

59. In Wheatstone bridge method of finding unknown resistance or inductance, the instrument used as null detector is ?

In Wheatstone bridge method of finding unknown resistance or inductance, the instrument used as null detector is ?

- (1) All of these / ये सभी
- (2) Voltmeter / Voltmeter
- (3) Galvanometer / Galvanometer
- (4) Ammeter / Ammeter

Correct Answer / सही उत्तर : (3) Galvanometer / Galvanometer

Solution / हल : Correct option: Galvanometer | सही विकल्प: Galvanometer

60. A coil having inductance 0.15 H and resistance 15 is connected across a 220 V, 50 Hz line. Compute the current in the coil ?

A coil having inductance 0.15 H and resistance 15 is connected across a 220 V, 50 Hz line. Compute the current in the coil ?

- (1) 3.50 A / 3.50 A
- (2) 4.25 A / 4.25 A
- (3) 4.45 A / 4.45 A
- (4) 4.00 A / 4.00 A

Correct Answer / सही उत्तर : (3) 4.45 A / 4.45 A

Solution / हल : Correct option: 4.45 A | सही विकल्प: 4.45 A

SECTION C - CHEMISTRY / खण्ड C - रसायन विज्ञान

61. An alkaloid containing an indole core and produced in living organism from the amino acid tryptophan is _____ ?

ट्रिप्टोफैन से जीव में बनने वाला इंडोल-कोर युक्त एल्केलॉइड कौन-सा है ?

- (1) Ephedrine / एफेड्रिन
- (2) Bufotenin / ब्यूफोटेनिन
- (3) Quinine / क्विनीन
- (4) Piperine / पाइपरीन

Correct Answer / सही उत्तर : (2) Bufotenin / ब्यूफोटेनिन

Solution / हल : Bufotenin is an indole alkaloid from tryptophan. | ब्यूफोटेनिन ट्रिप्टोफैन से बना इंडोल एल्केलॉइड है।

62. Graphite has _____ ?

ग्रेफाइट में किस प्रकार का संकरण होता है ?

- (1) sp³ / sp³
- (2) sp³ and sp / sp³ व sp
- (3) sp² / sp²
- (4) sp / sp

Correct Answer / सही उत्तर : (3) sp² / sp²

Solution / हल : Graphite carbon is sp² hybridised. | ग्रेफाइट का कार्बन sp² संकरित है।

63. What is the compound C in the following reaction sequence?

निम्न अभिक्रिया क्रम में यौगिक C क्या है ?

- (1) 1-Bromopropane / 1-ब्रोमोप्रोपेन
- (2) 1, 2-Dibromopropane / 1,2-डाइब्रोमोप्रोपेन
- (3) 2, 2 Dibromopropane / 2,2-डाइब्रोमोप्रोपेन
- (4) 2-Bromopropane / 2-ब्रोमोप्रोपेन

Correct Answer / सही उत्तर : (4) 2-Bromopropane / 2-ब्रोमोप्रोपेन

Solution / हल : Compound C in the sequence is 2-bromopropane. | क्रम में यौगिक C 2-ब्रोमोप्रोपेन है।

64. The metallic lustre exhibited by freshly cut sodium piece is explained by ?

ताज़े कटे सोडियम की धात्विक चमक किससे समझाई जाती है ?

- (1) conversion of metal atoms to its shining oxide / धातु का चमकीले ऑक्साइड में परिवर्तन
- (2) excitation of free protons of sodium metal / सोडियम के मुक्त प्रोटॉन का उत्तेजन
- (3) oscillations of loosely bound electrons / ढीले बंधे इलेक्ट्रॉनों का दोलन
- (4) diffusion of sodium ions on the surface / सतह पर सोडियम आयनों का विसरण

Correct Answer / सही उत्तर : (3) oscillations of loosely bound electrons / ढीले बंधे इलेक्ट्रॉनों का दोलन

Solution / हल : Metallic lustre of sodium is due to oscillation of loosely bound electrons. | सोडियम की धात्विक चमक ढीले बंधे इलेक्ट्रॉनों के दोलन से है।

65. SN and SN reactions follow: 2 1 SN ?

SN and SN reactions follow: 2 1 SN ?

- (1) First and second order / प्रथम व द्वितीय कोटि
- (2) Both follow second order / दोनों द्वितीय कोटि
- (3) Second and first order / द्वितीय व प्रथम कोटि
- (4) Both follow first order / दोनों प्रथम कोटि

Correct Answer / सही उत्तर : (3) Second and first order / द्वितीय व प्रथम कोटि

Solution / हल : Correct option: Second and first order | सही विकल्प: द्वितीय व प्रथम कोटि

66. Reactors which use UO Pellets enriched to 2 2.3% fuel, D O as moderators and water as 2 coolant is called _____ ?

2.3% समृद्ध UO_2 ईंधन, D_2O मॉडरेटर व जल शीतलक वाले रिएक्टर क्या कहलाते हैं ?

- (1) Pressurised water reactor / दाबित जल रिएक्टर
- (2) Steam generating heavy water reactor / भाप उत्पादक भारी जल रिएक्टर
- (3) Fast breeder reactor / फास्ट ब्रीडर रिएक्टर
- (4) Boiling water reactor / क्वथन जल रिएक्टर

Correct Answer / सही उत्तर : (2) Steam generating heavy water reactor / भाप उत्पादक भारी जल रिएक्टर

Solution / हल : UO_2 (2.3%) with D_2O moderator is a steam-generating heavy water reactor. | UO_2 (2.3%) व D_2O मॉडरेटर वाला भाप उत्पादक भारी जल रिएक्टर है।

67. These both hybridization have octahedral geometry. 98. Shape of $Mg [Th(NO)]$ is: 3 6 $Mg [Th(NO)]$

These both hybridization have octahedral geometry. 98. Shape of $Mg [Th(NO)]$ is: 3 6 $Mg [Th(NO)]$

- (1) Icosahedral / विंशतिफलकीय
- (2) Square antiprism / वर्ग प्रतिप्रिज्म
- (3) Pentagonal bipyramidal / पंचकोणीय द्विपिरामिडीय
- (4) Octahedral / अष्टफलकीय

Correct Answer / सही उत्तर : (1) Icosahedral / विंशतिफलकीय

Solution / हल : Correct option: Icosahedral | सही विकल्प: विंशतिफलकीय

68. Formation of RNA from DNA is known as: DNA mes RNA ?

DNA से RNA का निर्माण क्या कहलाता है ?

- (1) Translation / अनुवाद
- (2) Transcription / अनुलेखन (Transcription)
- (3) Replication / प्रतिकृतिकरण
- (4) Polymerisation / बहुलकन

Correct Answer / सही उत्तर : (2) Transcription / अनुलेखन (Transcription)

Solution / हल : Formation of RNA from DNA is transcription. | DNA से RNA का निर्माण अनुलेखन है।

69. "A given compound always contains exactly the same proportion of elements by weight" is stated under which law?

'दिए यौगिक में तत्वों का भार अनुपात सदैव समान रहता है' — यह किस नियम के अंतर्गत है ?

- (1) Law of multiple proportions / गुणित अनुपात नियम
- (2) Law of definite proportions / निश्चित अनुपात नियम
- (3) Avogadro's law / अवोगाद्रो नियम
- (4) Law of conservation of mass / द्रव्यमान संरक्षण नियम

Correct Answer / सही उत्तर : (2) Law of definite proportions / निश्चित अनुपात नियम

Solution / हल : Constant proportion by weight is the law of definite proportions. | भार अनुपात स्थिर रहना निश्चित अनुपात नियम है।

70. The element with atomic number 37 belongs to which block in the modern periodic table?

परमाणु क्रमांक 37 वाला तत्व आधुनिक आवर्त सारणी के किस ब्लॉक में है ?

- (1) d-block / d-ब्लॉक
- (2) p-block / p-ब्लॉक
- (3) f-block / f-ब्लॉक
- (4) s-block / s-ब्लॉक

Correct Answer / सही उत्तर : (4) s-block / s-ब्लॉक

Solution / हल : Element 37 (Rb) belongs to the s-block. | तत्व 37 (Rb) s-ब्लॉक का है।

71. An element X essentially used in fertilisers and soap is obtained by electrolysis at high temperatures along with sodium. Element X is _____ ?

उर्वरक व साबुन में प्रयुक्त तत्व X उच्च ताप पर सोडियम सहित विद्युत-अपघटन से प्राप्त होता है — X क्या है ?

- (1) Lithium / लिथियम
- (2) Potassium / पोटैशियम
- (3) Sodium / सोडियम
- (4) Rubidium / रुबिडियम

Correct Answer / सही उत्तर : (2) Potassium / पोटैशियम

Solution / हल : Element X used in fertilisers/soap obtained with sodium is potassium. | उर्वरक/साबुन में प्रयुक्त तत्व X (सोडियम सहित प्राप्त) पोटैशियम है।

72. Which ligand is used in elimination of harmful radioactive metals from the body?

शरीर से हानिकारक रेडियोधर्मी धातुओं के निष्कासन में कौन-सा लिगेंड प्रयोग होता है ?

- (1) CN / CN
- (2) Cl / Cl
- (3) NCS / NCS
- (4) EDTA / EDTA

Correct Answer / सही उत्तर : (4) EDTA / EDTA

Solution / हल : EDTA is used to remove harmful radioactive metals (chelation). | EDTA हानिकारक रेडियोधर्मी धातुओं को हटाने (कीलेशन) में प्रयुक्त होता है।

73. Which of the following statements is incorrect with respect to a carbanion?

कार्बनरूपायन (carbanion) के संबंध में कौन-सा कथन गलत है ?

- (1) Its hybridization is sp^2 and geometry is planar / इसका संकरण sp^2 व ज्यामिति समतलीय है
- (2) It is diamagnetic / यह प्रतिचुंबकीय है
- (3) It is formed by heterolytic bond fission / यह विषमांगी बंध विदलन से बनता है
- (4) It behaves as a charged nucleophile / यह आवेशित नाभिकरागी की तरह व्यवहार करता है

Correct Answer / सही उत्तर : (1) Its hybridization is sp^2 and geometry is planar / इसका संकरण sp^2 व ज्यामिति समतलीय है

Solution / हल : Carbanion is sp^3 and pyramidal, so ' sp^2 and planar' is incorrect. | कार्बनरूपायन sp^3 व पिरामिडीय है, अतः ' sp^2 व समतलीय' गलत है।

74. What of the following thermochemical equations corresponds to the definition of enthalpy of formation at 298K?

What of the following thermochemical equations corresponds to the definition of enthalpy of formation at 298K?

- (1) $C(\text{graphite}) + 2H_2(g) \rightarrow C(\text{graphite}) + 2H_2(g)$
- (2) $2C(\text{graphite}) + 4H(g) + O(g) \rightarrow 2C(\text{graphite}) + 4H(g) + O(g)$
- (3) $C(\text{graphite}) + 2H(g) \rightarrow C(\text{graphite}) + 2H(g)$
- (4) $C(\text{diamond}) + 2H(g) \rightarrow C(\text{diamond}) + 2H(g)$

Correct Answer / सही उत्तर : (1) $C(\text{graphite}) + 2H_2(g) \rightarrow C(\text{graphite}) + 2H_2(g)$

Solution / हल : Correct option: $C(\text{graphite}) + 2H_2(g) \rightarrow C(\text{graphite}) + 2H_2(g)$ | सही विकल्प: $C(\text{graphite}) + 2H_2(g) \rightarrow C(\text{graphite}) + 2H_2(g)$

75. If pure ribosomal preparation from E-coli is sedimented at a high Mg^{2+} concentration, the preparation sediments given _____ ?

उच्च Mg^{2+} सांद्रता पर E. coli के शुद्ध राइबोसोम के अवसादन में क्या मिलता है ?

- (1) 1 peak at 70 s / 70s पर 1 शिखर
- (2) 3 peaks at 70s, 50 s and 30 s / 70s, 50s, 30s पर 3 शिखर
- (3) No peak at all / कोई शिखर नहीं
- (4) 2 peaks of 30s and 50 s enclosing more area / 30s व 50s के 2 शिखर

Correct Answer / सही उत्तर : (1) 1 peak at 70 s / 70s पर 1 शिखर

Solution / हल : E.coli ribosomes at high Mg^{2+} give one peak at 70 S. | उच्च Mg^{2+} पर E.coli राइबोसोम 70S पर एक शिखर देते हैं।

76. Which of the following is not an example of fibrous protein?

निम्नलिखित में कौन रेशेदार प्रोटीन का उदाहरण नहीं है ?

- (1) Collagen / कोलाजन
- (2) Haemoglobin / हीमोग्लोबिन
- (3) Fibroin / फाइब्रोइन
- (4) Keratin / केरेटिन

Correct Answer / सही उत्तर : (2) Haemoglobin / हीमोग्लोबिन

Solution / हल : Haemoglobin is a globular protein, not fibrous. | हीमोग्लोबिन गोलाकार प्रोटीन है, रेशेदार नहीं।

77. A sample of sulphuric acid with density 1.8 ?

घनत्व 1.8 वाले सल्फ्यूरिक अम्ल के नमूने में... कितना mL ?

- (1) 12 mL / 12 mL
- (2) 18 mL / 18 mL
- (3) 16 mL / 16 mL
- (4) 10 mL / 10 mL

Correct Answer / सही उत्तर : (1) 12 mL / 12 mL

Solution / हल : About 12 mL of the concentrated sulphuric acid is needed. | लगभग 12 mL सांद्र सल्फ्यूरिक अम्ल चाहिए।

78. Which of the following is a tranquilizer?

निम्नलिखित में कौन ट्रैन्क्विलाइज़र है ?

- (1) Rantac / रैनटैक
- (2) Amoxicilin / एमॉक्सिसिलिन
- (3) Oxytocin / ऑक्सिटोसिन
- (4) Valium / वैलियम

Correct Answer / सही उत्तर : (4) Valium / वैलियम

Solution / हल : Valium (diazepam) is a tranquilizer. | वैलियम (डायज़ेपाम) ट्रैन्क्विलाइज़र है।

79. The states of hybridization of nitrogen in pyridine and piperidine, respectively are _____ ?

पिरिडीन व पिपरिडीन में नाइट्रोजन की संकरण अवस्था क्रमशः क्या है ?

- (1) sp and sp³ / sp व sp³
- (2) sp² and sp / sp² व sp
- (3) sp² and sp³ / sp² व sp³
- (4) sp³ and sp² / sp³ व sp²

Correct Answer / सही उत्तर : (3) sp² and sp³ / sp² व sp³

Solution / हल : Nitrogen in pyridine is sp² and in piperidine sp³. | पिरिडीन में नाइट्रोजन sp² व पिपेरिडीन में sp³ है।

80. Which among (A) cyclohexane (B) cyclopentane (C) cyclopropane (D) cyclobutane possesses a Bayer strain of 19 ?

Which among (A) cyclohexane (B) cyclopentane (C) cyclopropane (D) cyclobutane possesses a Bayer strain of 19 ?

- (1) cyclopropane / cyclopropane
- (2) cyclopentane / cyclopentane
- (3) cyclohexane / cyclohexane
- (4) cyclobutane / cyclobutane

Correct Answer / सही उत्तर : (4) cyclobutane / cyclobutane

Solution / हल : Correct option: cyclobutane | सही विकल्प: cyclobutane

81. The minimum amount of fissionable material that can produce a self sustaining chain reaction is called _____ ?

स्वपोषित श्रृंखला अभिक्रिया उत्पन्न करने वाली विखंडनीय पदार्थ की न्यूनतम मात्रा क्या कहलाती है ?

- (1) Innoculum / इनोकुलम
- (2) Feed / फीड
- (3) Critical mass / क्रांतिक द्रव्यमान
- (4) Flux / फ्लक्स

Correct Answer / सही उत्तर : (3) Critical mass / क्रांतिक द्रव्यमान

Solution / हल : The minimum fissile mass for a chain reaction is the critical mass. | श्रृंखला अभिक्रिया हेतु न्यूनतम विखंडनीय द्रव्यमान क्रांतिक द्रव्यमान है।

82. Chemical reactions that proceed from reactants to products through one or more intermediate stage(s) are called: pees jemees ?

अभिकारक से उत्पाद तक एक या अधिक मध्यवर्ती अवस्थाओं से होने वाली अभिक्रियाएँ क्या कहलाती हैं ?

- (1) Consecutive reactions / क्रमिक अभिक्रियाएँ
- (2) Parallel reactions / समांतर अभिक्रियाएँ
- (3) Simple reactions / सरल अभिक्रियाएँ
- (4) Opposing reactions / विरोधी अभिक्रियाएँ

Correct Answer / सही उत्तर : (1) Consecutive reactions / क्रमिक अभिक्रियाएँ

Solution / हल : Reactions via intermediates are consecutive reactions. | मध्यवर्ती से होने वाली अभिक्रियाएँ क्रमिक अभिक्रियाएँ हैं।

83. d₄ or d₁₀ metal complexes where non-bonding orbitals are either partially or fully filled electronically favour which structure?

d₄ या d₁₀ धातु संकुल जिनमें अबंधनी कक्षक आंशिक/पूर्ण भरे हों, किस संरचना को प्राथमिकता देते हैं ?

- (1) Distorted Square planar / विकृत वर्ग समतलीय
- (2) Square planar / वर्ग समतलीय
- (3) Tetrahedral / चतुष्फलकीय
- (4) Octahedral / अष्टफलकीय

Correct Answer / सही उत्तर : (3) Tetrahedral / चतुष्फलकीय

Solution / हल : d₄/d₁₀ complexes favour the tetrahedral structure. | d₄/d₁₀ संकुल चतुष्फलकीय संरचना को प्राथमिकता देते हैं।

84. An aqueous solution of sodium cyanide has the pH ?
An aqueous solution of sodium cyanide has the pH ?

- (1) less than / कम
- (2) equal to / बराबर
- (3) greater than / अधिक
- (4) outside the range of / सीमा के बाहर

Correct Answer / सही उत्तर : (3) greater than / अधिक

Solution / हल : Correct option: greater than | सही विकल्प: अधिक

85. Which of the following forms of tartaric acid is not optically active?
टार्टरिक अम्ल का कौन-सा रूप प्रकाशिक रूप से सक्रिय नहीं है ?

- (1) Meso form / मेसो रूप
- (2) Dextro form / डेक्स्ट्रो रूप
- (3) Laevo form / लीवो रूप
- (4) Dextro and Laevo both forms / डेक्स्ट्रो व लीवो दोनों

Correct Answer / सही उत्तर : (1) Meso form / मेसो रूप

Solution / हल : The meso form of tartaric acid is optically inactive. | टार्टरिक अम्ल का मेसो रूप प्रकाशिक रूप से निष्क्रिय है।

SECTION D - COMPUTER / खण्ड D - कंप्यूटर

86. Which one is used for complex scientific calculation?
जटिल वैज्ञानिक गणना के लिए कौन-सी भाषा प्रयोग होती है ?

- (1) BASIC / BASIC
- (2) FORTRAN / FORTRAN
- (3) COBOL / COBOL
- (4) PASCAL / PASCAL

Correct Answer / सही उत्तर : (2) FORTRAN / FORTRAN

Solution / हल : FORTRAN is used for complex scientific calculations. | जटिल वैज्ञानिक गणना के लिए FORTRAN प्रयोग होती है।

87. 100 nibbles are equal to _____ bits. efveyeume (nibbles).....efye ?
100 nibbles are equal to _____ bits. efveyeume (nibbles).....efye ?

- (1) 512 / 512
- (2) 256 / 256
- (3) 200 / 200
- (4) 400 / 400

Correct Answer / सही उत्तर : (4) 400 / 400

Solution / हल : Correct option: 400 | सही विकल्प: 400

88. Non-volatile memory is a type of computer memory that can retain stored information even when the computer is vee@ve-Jeesues ?

Non-volatile memory is a type of computer memory that can retain stored information even when the computer is vee@ve-Jeesues ?

- (1) not / not
- (2) powered / powered
- (3) intermittently powered / intermittently powered
- (4) not processed / not processed

Correct Answer / सही उत्तर : (1) not / not

Solution / हल : Correct option: not | सही विकल्प: not

89. A sort algorithm works on the following principle ?

A sort algorithm works on the following principle ?

- (1) Merge sort / Merge sort
- (2) Insertion / Insertion
- (3) Quick sort / Quick sort
- (4) Selection sort / Selection sort

Correct Answer / सही उत्तर : (4) Selection sort / Selection sort

Solution / हल : Correct option: Selection sort | सही विकल्प: Selection sort

90. How many Bytes make a Kilobyte?

एक किलोबाइट कितने बाइट का होता है ?

- (1) 960 / 960
- (2) 1024 / 1024
- (3) 100 CCC Oct / 100
- (4) 1440 / 1440

Correct Answer / सही उत्तर : (2) 1024 / 1024

Solution / हल : 1 Kilobyte = 1024 bytes. | 1 किलोबाइट = 1024 बाइट।

91. Which of the following is NOT a characteristic of RAM?

Which of the following is NOT a characteristic of RAM?

- (1) Expensive / Expensive
- (2) Smaller / Smaller
- (3) High power consumption / High power consumption
- (4) Faster / Faster

Correct Answer / सही उत्तर : (2) Smaller / Smaller

Solution / हल : Correct option: Smaller | सही विकल्प: Smaller

92. A Storage system for small amount of data is?

कम मात्रा के डेटा हेतु भंडारण प्रणाली कौन-सी है ?

- (1) Punched Card / पंच्ड कार्ड
- (2) Magnetic Card / चुंबकीय कार्ड
- (3) Magnetic Tape / चुंबकीय टेप
- (4) Optical Mark Reader / ऑप्टिकल मार्क रीडर

Correct Answer / सही उत्तर : (2) Magnetic Card / चुंबकीय कार्ड

Solution / हल : A magnetic card stores a small amount of data. | चुंबकीय कार्ड कम मात्रा का डेटा संग्रहीत करता है।

93. With respect to operating systems, which of the following is NOT a valid process state?

ऑपरेटिंग सिस्टम के संदर्भ में कौन-सी प्रक्रिया अवस्था मान्य नहीं है ?

- (1) Starving / स्टार्विंग
- (2) Waiting / वेटिंग
- (3) Ready / रेडी
- (4) Running / रनिंग

Correct Answer / सही उत्तर : (1) Starving / स्टार्विंग

Solution / हल : 'Starving' is not a valid OS process state. | 'स्टार्विंग' मान्य OS प्रक्रिया अवस्था नहीं है।

94. Time Complexity of DFS is?

DFS की समय जटिलता क्या है ?

- (1) None of / None of
- (2) $O(V)$ / $O(V)$
- (3) $O(V + E)$ / $O(V + E)$
- (4) $O(C)$ these / इनमें से

Correct Answer / सही उत्तर : (3) $O(V + E)$ / $O(V + E)$

Solution / हल : Time complexity of DFS is $O(V + E)$. | DFS की समय जटिलता $O(V + E)$ है।

95. A _____ shows how operational attributes are linked together and contributes towards realising computer's ?

कौन-सा दर्शाता है कि परिचालन गुण कैसे जुड़े हैं और कंप्यूटर के व्यवहार में योगदान देते हैं ?

- (1) computer / कंप्यूटर
- (2) component architecture / घटक संरचना
- (3) computer organization / कंप्यूटर संगठन
- (4) computer working / कंप्यूटर कार्य

Correct Answer / सही उत्तर : (3) computer organization / कंप्यूटर संगठन

Solution / हल : Computer organization shows how attributes link to function. | कंप्यूटर संगठन दर्शाता है कि गुण कार्य से कैसे जुड़े हैं।

SECTION E - MENTAL ABILITY / खण्ड E - मानसिक योग्यता

96. Naresh purchased a TV set for Rs.11,250 after getting discount of 10% on the labelled price. He spent Rs.150 on transport and Rs.800 on installation. At what price should it be sold so that the profit earned would be 15% if no discount was offered? (?

नरेश ने अंकित मूल्य पर 10% छूट के बाद TV ₹11,250 में खरीदा, ₹150 परिवहन व ₹800 स्थापना पर खर्च किए। बिना छूट 15% लाभ हेतु किस मूल्य पर बेचे ?

- (1) Rs. 13,450 / ₹134.50
- (2) Rs.14,030 / ₹14,030
- (3) Rs.15,467.50 / ₹15,467.50
- (4) Rs.12,937.50 / ₹12,937.50

Correct Answer / सही उत्तर : (3) Rs.15,467.50 / ₹15,467.50

Solution / हल : With cost Rs.12,500+950 and 15% profit on label, SP = Rs.15,467.50. | लागत ₹12,500+950 व लेबल पर 15% लाभ => SP = ₹15,467.50।

97. When the price of a radio was reduced by 20%, its sale increased by 80%. What was the net effect on the sale? (?

जब एक रेडियो की कीमत 20% घटाई गई तो बिक्री 80% बढ़ गई। बिक्री (राजस्व) पर शुद्ध प्रभाव क्या रहा ?

- (1) 44% increase / 44% वृद्धि
- (2) 75% increase / 75% वृद्धि
- (3) 66% increase / 66% वृद्धि
- (4) 44% decrease / 44% कमी

Correct Answer / सही उत्तर : (1) 44% increase / 44% वृद्धि

Solution / हल : Revenue effect = $0.8 \times 1.8 = 1.44$ => 44% increase. | प्रभाव = $0.8 \times 1.8 = 1.44$ => 44% वृद्धि।

98. Ms. Sujata invests 7% i.e. Rs. 2170 of her monthly salary in mutual funds. Later she invests 18% of her monthly salary in recurring deposits also, she invests 6% of her salary on NSC's. What is the total annual amount invested by Ms. Sujata ?

सुश्री सुजाता अपने वेतन का 7% (₹2170) म्यूचुअल फंड में, 18% आवर्ती जमा में व 6% NSC में निवेश करती हैं। कुल वार्षिक निवेश राशि क्या है ?

- (1) Rs. 1,35,120 / ₹1,35,120
- (2) Rs. 1,25,320 / ₹1,25,320
- (3) Rs. 1,15,320 / ₹1,15,320
- (4) Rs. 1,13,520 / ₹1,13,520

Correct Answer / सही उत्तर : (3) Rs. 1,15,320 / ₹1,15,320

Solution / हल : Salary=2170/0.07=31000; total invest 31% => Rs.1,15,320/yr. | वेतन=2170/0.07=31000; कुल निवेश 31% => ₹1,15,320/वर्षी

99. A man can row 30 km upstream and 44 km downstream in 10 hrs. Also, he can row 40 km upstream and 55 km downstream in 13 hrs. Find the speed of the man in still water ?

A man can row 30 km upstream and 44 km downstream in 10 hrs. Also, he can row 40 km upstream and 55 km downstream in 13 hrs. Find the speed of the man in still water ?

- (1) 8 km/hr / 8 km/hr
- (2) 10 km/hr / 10 km/hr
- (3) 5 km/hr / 5 km/hr
- (4) 12 km/hr / 12 km/hr

Correct Answer / सही उत्तर : (1) 8 km/hr / 8 km/hr

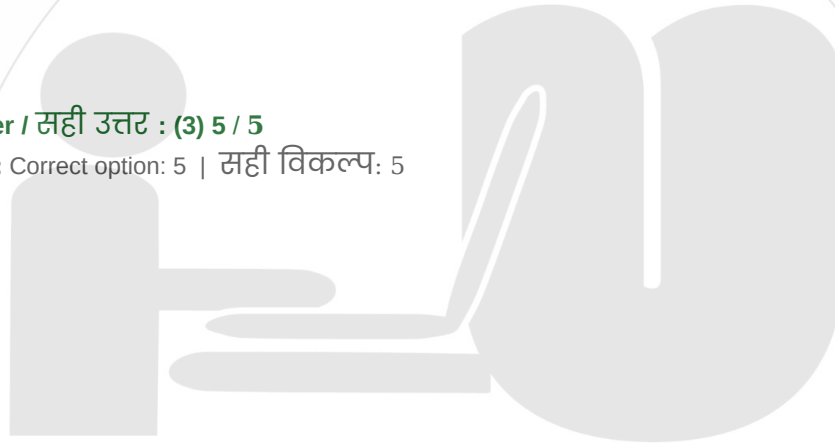
Solution / हल : Correct option: 8 km/hr | सही विकल्प: 8 km/hr

100. The length of the two trains are 60 m and 90 m are running at the speed of 58 km/hr and 50km/hr respectively on parallel tracks in opposite direction. In how many seconds will they pass each other? (?
The length of the two trains are 60 m and 90 m are running at the speed of 58 km/hr and 50km/hr respectively on parallel tracks in opposite direction. In how many seconds will they pass each other? (?

- (1) 3 / 3 : 1
- (2) 10 / 1, 0
- (3) 5 / 5
- (4) 8 / 8

Correct Answer / सही उत्तर : (3) 5 / 5

Solution / हल : Correct option: 5 | सही विकल्प: 5



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