

# UNIVERSITY OF LUCKNOW

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

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

**MODEL PAPER - SET 12 / प्रतिदर्श प्रश्नपत्र - सेट 12**

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. A cylinder has a diameter of 14 cm and its area cm<sup>2</sup>. of curved surface is 220 The volume of the cylinder is: cm<sup>3</sup> cm<sup>3</sup> ?

A cylinder has a diameter of 14 cm and its area cm<sup>2</sup>. of curved surface is 220 The volume of the cylinder is: cm<sup>3</sup> cm<sup>3</sup> ?

- (1) 770 cm<sup>3</sup> / 770 cm<sup>3</sup>
- (2) 3080 / 3080
- (3) 1000 / 1000
- (4) 1540 cm<sup>3</sup> / 1540 cm<sup>3</sup>

**Correct Answer / सही उत्तर : (1) 770 cm<sup>3</sup> / 770 cm<sup>3</sup>**

Solution / हल : Correct option: 770 cm<sup>3</sup> | सही विकल्प: 770 cm<sup>3</sup>

2. If =1, then the smallest positive ?

If =1, then the smallest positive ?

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

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

Solution / हल : Correct option: 2 | सही विकल्प: 2 : 1

3. The external direct product of two cyclic groups is \_\_\_\_\_ ?

The external direct product of two cyclic groups is \_\_\_\_\_ ?

- (1) always cyclic / always cyclic
- (2) need not cyclic / need not cyclic
- (3) abelian / abelian
- (4) never cyclic / never cyclic

**Correct Answer / सही उत्तर : (2) need not cyclic / need not cyclic**

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

4. A: All upper triangular matrices are in echelon form. B: All matrices in echelon form are upper triangular matrices ?

A: All upper triangular matrices are in echelon form. B: All matrices in echelon form are upper triangular matrices ?

- (1) Statement A is true and B is true / Statement A is true and B is true
- (2) Statement A is true and B is false / Statement A is true and B is false
- (3) Statement A is false and B is true / Statement A is false and B is true
- (4) Statement A is false and B is false / Statement A is false and B is false

**Correct Answer / सही उत्तर : (2) Statement A is true and B is false / Statement A is true and B is false**

Solution / हल : Correct option: Statement A is true and B is false | सही विकल्प: Statement A is true and B is false

5. Find the remainder when 3215 is divided by 43 ?

Find the remainder when 3215 is divided by 43 ?

- (1) 35 / 3.5%
- (2) 30 / 30
- (3) 28 / 28
- (4) 33 / 3.3%

**Correct Answer / सही उत्तर : (3) 28 / 28**

**Solution / हल :** Correct option: 28 | सही विकल्प: 28

6. Let  $[x]$  denotes the greatest integer less than or equal to  $x$ . If  $f(x) = [x \sin x]$  ?  
Let  $[x]$  denotes the greatest integer less than or equal to  $x$ . If  $f(x) = [x \sin x]$  ?

- (1) differentiable in  $(-1,1)$  / differentiable in  $(-1,1)$
- (2) differentiable at  $x = 1$  / differentiable at  $x = 1$
- (3) continuous at  $x = 0$  / continuous at  $x = 0$
- (4) continuous in  $(-1,0)$  / continuous in  $(-1,0)$

**Correct Answer / सही उत्तर : (2) differentiable at  $x = 1$  / differentiable at  $x = 1$**

**Solution / हल :** Correct option: differentiable at  $x = 1$  | सही विकल्प: differentiable at  $x = 1$

7. Find the sum of the cubes of the roots of the equation  $x^3 - 6x^2 + 11x - 6 = 0$  ?

Find the sum of the cubes of the roots of the equation  $x^3 - 6x^2 + 11x - 6 = 0$  ?

- (1) 35 / 3.5%
- (2)  $36x^3 - 6x^2$  /  $36x^3 - 6x^2$
- (3) 31 / 31%
- (4) 32 / 32

**Correct Answer / सही उत्तर : (2)  $36x^3 - 6x^2$  /  $36x^3 - 6x^2$**

**Solution / हल :** Correct option:  $36x^3 - 6x^2$  | सही विकल्प:  $36x^3 - 6x^2$

8. The external direct product of additive group of integers  $Z$  With itself is?

The external direct product of additive group of integers  $Z$  With itself is?

- (1) cyclic order / cyclic order
- (2) cyclic of finite / cyclic of finite
- (3) not cyclic / not cyclic
- (4) Can not say / Can not say

**Correct Answer / सही उत्तर : (3) not cyclic / not cyclic**

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

9. For what value of  $a$ , the equation  $ax^2 + 2x + a = 0$  ?

For what value of  $a$ , the equation  $ax^2 + 2x + a = 0$  ?

- (1)  $a = 6$  /  $a = 6$
- (2)  $a = 0, 2$  /  $a = 0, 2$
- (3)  $a = 0$  /  $a = 0$
- (4)  $a = 0, 6$  /  $a = 0, 6$

**Correct Answer / सही उत्तर : (1)  $a = 6$  /  $a = 6$**

**Solution / हल :** Correct option:  $a = 6$  | सही विकल्प:  $a = 6$

10. The number of ways to distribute 20 identical balls in 4 different boxes such that no box remains empty is ?

The number of ways to distribute 20 identical balls in 4 different boxes such that no box remains empty is ?

- (1) 323 / 323
- (2) 696 / 696
- (3) 969 / 969
- (4) 52 / 52%

**Correct Answer / सही उत्तर : (3) 969 / 969**

**Solution / हल :** Correct option: 969 | सही विकल्प: 969

11. Which theorem is valid in calculating integral for a multiple connected domain R?

Which theorem is valid in calculating integral for a multiple connected domain R?

- (1) theorem / theorem
- (2) Iterated integrals / Iterated integrals
- (3) Gauss divergence theorem / Gauss divergence theorem
- (4) Green's theorem / Green's theorem

**Correct Answer / सही उत्तर : (4) Green's theorem / Green's theorem**

Solution / हल : Correct option: Green's theorem | सही विकल्प: Green's theorem

12. If f is continuous on [a,b], then f is ?

If f is continuous on [a,b], then f is ?

- (1) integrable / integrable
- (2) differentiable / differentiable
- (3) increasing / increasing
- (4) decreasing / decreasing

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

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

13. If the mean of n observations is  $46n$ , then n is equal to: 11 ?

If the mean of n observations is  $46n$ , then n is equal to: 11 ?

- (1) 11 / 1, 1
- (2) 22 / 22
- (3) 12 / 12%
- (4) 23 / 2.3%

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

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

14. What is the nature of the roots of this equation  $x^2$  ?

What is the nature of the roots of this equation  $x^2$  ?

- (1) Complex, / Complex,
- (2) Real, Unequal, Irrational / Real, Unequal, Irrational
- (3) Real, Unequal, Rational / Real, Unequal, Rational
- (4) Real, Equal,  $x^2$  / Real, Equal,  $x^2$

**Correct Answer / सही उत्तर : (2) Real, Unequal, Irrational / Real, Unequal, Irrational**

Solution / हल : Correct option: Real, Unequal, Irrational | सही विकल्प: Real, Unequal, Irrational

15. PQ is the direct common tangent of two circles (S, 9 cm) and (R, 4 cm) which touch each other externally. Find the area of the quadrilateral  $\text{cm}^2$ ?

PQ is the direct common tangent of two circles (S, 9 cm) and (R, 4 cm) which touch each other externally. Find the area of the quadrilateral  $\text{cm}^2$ ?

- (1) 65 / 65
- (2) 72 / 72
- (3) 69 / 69
- (4) 78 / 78

**Correct Answer / सही उत्तर : (4) 78 / 78**

Solution / हल : Correct option: 78 | सही विकल्प: 78

16. Applying Lagrange's Mean Value theorem to ?

Applying Lagrange's Mean Value theorem to ?

- (1) 1.5 / 15%
- (2) 1.25 / 12.5%
- (3) 2 / 2 : 1
- (4) 0.5 / 0.5

**Correct Answer / सही उत्तर : (1) 1.5 / 15%**

**Solution / हल :** Correct option: 1.5 | सही विकल्प: 15%

17. If  $f(x) = \frac{1}{x}$ , then value of  $|f(2)|$  ?

If  $f(x) = \frac{1}{x}$ , then value of  $|f(2)|$  ?

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

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

**Solution / हल :** Correct option: 2 | सही विकल्प: 2 : 1

18. The ordinary differential equation is:  $(d^2y)$  ?

The ordinary differential equation is:  $(d^2y)$  ?

- (1) Non linear and Non homogeneous / Non linear and Non homogeneous
- (2) Non linear and homogeneous / Non linear and homogeneous
- (3) Linear and Non homogeneous / Linear and Non homogeneous
- (4) Linear and homogeneous / Linear and homogeneous

**Correct Answer / सही उत्तर : (3) Linear and Non homogeneous / Linear and Non homogeneous**

**Solution / हल :** Correct option: Linear and Non homogeneous | सही विकल्प: Linear and Non homogeneous

19. When the per capita rate of increase (r) the same positive value regardless of the population size, then we get which growth?

When the per capita rate of increase (r) the same positive value regardless of the population size, then we get which growth?

- (1) both logistic and exponential / both logistic and exponential
- (2) logistics growth / logistics growth
- (3) transversal growth / transversal growth
- (4) exponential growth / चरघातांकी वृद्धि

**Correct Answer / सही उत्तर : (4) exponential growth / चरघातांकी वृद्धि**

**Solution / हल :** Correct option: exponential growth | सही विकल्प: चरघातांकी वृद्धि

20. If the roots of the quadratic equation  $(4+m)x^2+(m+1)x +1 = 0$  are equal than the value of m is ?

If the roots of the quadratic equation  $(4+m)x^2+(m+1)x +1 = 0$  are equal than the value of m is ?

- (1) 2 / 2 : 1
- (2) 4 / 4 : 1
- (3) 5 / 5
- (4) None of these / इनमें कोई नहीं

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

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

21. Which of the following is not true?

Which of the following is not true?

- (1)  $\{C \setminus \{0\}, x\}$  is a group /  $\{C \setminus \{0\}, x\}$  is a group
- (2)  $\{R \setminus \{0\}, x\}$  is a group /  $\{R \setminus \{0\}, x\}$  is a group
- (3)  $\{Z \setminus \{0\}, x\}$  is a group /  $\{Z \setminus \{0\}, x\}$  is a group
- (4)  $\{Q \setminus \{0\}, x\}$  is a group /  $\{Q \setminus \{0\}, x\}$  is a group

**Correct Answer / सही उत्तर : (3)  $\{Z \setminus \{0\}, x\}$  is a group /  $\{Z \setminus \{0\}, x\}$  is a group**

**Solution / हल :** Correct option:  $\{Z \setminus \{0\}, x\}$  is a group | सही विकल्प:  $\{Z \setminus \{0\}, x\}$  is a group

22. If  $|z + 4| = 3$  then the maximum value  $|z + 1|$  is ?

If  $|z + 4| = 3$  then the maximum value  $|z + 1|$  is ?

- (1) none of these / इनमें कोई नहीं
- (2) 0 / 0
- (3) 6 / 6
- (4) 4 / 4 : 1

**Correct Answer / सही उत्तर : (3) 6 / 6**

**Solution / हल :** Correct option: 6 | सही विकल्प: 6

23. The Eigen vectors corresponding to distinct Eigen values of a real symmetric matrix are ?  
The Eigen vectors corresponding to distinct Eigen values of a real symmetric matrix are ?

- (1) Distinct / Distinct
- (2) Symmetric / Symmetric
- (3) Orthogonal / Orthogonal
- (4) Invertible / Invertible

**Correct Answer / सही उत्तर : (3) Orthogonal / Orthogonal**

**Solution / हल :** Correct option: Orthogonal | सही विकल्प: Orthogonal

24. If  $dy = dx$ ; then what is equation of the y in terms of x if curves passes through (1, 2) ?  
If  $dy = dx$ ; then what is equation of the y in terms of x if curves passes through (1, 2) ?

- (1)  $x^5 / x^5$
- (2)  $x^6 / x^6$
- (3)  $x^5 + y / x^5 + y$
- (4)  $x^6 + 3y / x^6 + 3y$

**Correct Answer / सही उत्तर : (2)  $x^6 / x^6$**

**Solution / हल :** Correct option:  $x^6$  | सही विकल्प:  $x^6$

25. The contour on the xy-plane, where the partial  $x^2 y^2$  derivative of + with respect to y is equal to the partial derivative of  $6y + 4x$  with respect to x, is peneB  $x^2 y^2$  ?

The contour on the xy-plane, where the partial  $x^2 y^2$  derivative of + with respect to y is equal to the partial derivative of  $6y + 4x$  with respect to x, is peneB  $x^2 y^2$  ?

- (1)  $x + y = 4 / x + y = 4$
- (2)  $x = 2 / x = 2$
- (3)  $x / x$
- (4)  $y = 2 / y = 2$

**Correct Answer / सही उत्तर : (4)  $y = 2 / y = 2$**

**Solution / हल :** Correct option:  $y = 2$  | सही विकल्प:  $y = 2$

26. Which of the following is not a component of mathematical model?  
Which of the following is not a component of mathematical model?

- (1) variables / variables
- (2) factors / कारक
- (3) constants / constants
- (4) noise parameters / noise parameters

**Correct Answer / सही उत्तर : (2) factors / कारक**

**Solution / हल :** Correct option: factors | सही विकल्प: कारक

27. What will be the rank of every non-singular matrix of order n?  
What will be the rank of every non-singular matrix of order n?

- (1)  $2n + 1 / (2n+1)\lambda/2$
- (2)  $n / n$
- (3)  $n + 1 / n + 1$
- (4)  $2n / 2n$

**Correct Answer / सही उत्तर : (2)  $n / n$**

**Solution / हल :** Correct option: n | सही विकल्प: n

28. If  $f(x)$  and  $g(x)$  defined as  $f(x) = 1$ , if  $x$  ?

If  $f(x)$  and  $g(x)$  defined as  $\{f(x) = 1, \text{ if } x\}$  ?

- (1)  $f$  is not continuous /  $g$  is not continuous
- (2)  $f$  and  $g$  both are continuous /  $f$  and  $g$  both are continuous
- (3)  $f$  is not continuous /  $f$  is not continuous
- (4)  $g$  is not continuous /  $g$  is not continuous

**Correct Answer / सही उत्तर : (1)  $f$  is not continuous /  $g$  is not continuous**

Solution / हल : Correct option:  $f$  is not continuous | सही विकल्प:  $f$  is not continuous

29. If A and B are mutually exclusive events such that  $P(A) = 0.29$  and  $P(B) = 0.43$ , then  $P(A \cup B)$  ?

If A and B are mutually exclusive events such that  $P(A) = 0.29$  and  $P(B) = 0.43$ , then  $P(A \cup B)$  ?

- (1) 0.85 / 0.85
- (2) 0.37 / 0.37
- (3) 0.50 / 0.50
- (4) 0.29 / 0.29

**Correct Answer / सही उत्तर : (4) 0.29 / 0.29**

Solution / हल : Correct option: 0.29 | सही विकल्प: 0.29

30. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Then the inner surface area of the vessel is:  $\text{cm}^2$  ?

A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Then the inner surface area of the vessel is:  $\text{cm}^2$  ?

- (1) 527  $\text{cm}^2$  / 527  $\text{cm}^2$
- (2) 542  $\text{cm}^2$  / 542  $\text{cm}^2$
- (3) 562 / 562
- (4) 572 / 572

**Correct Answer / सही उत्तर : (4) 572 / 572**

Solution / हल : Correct option: 572 | सही विकल्प: 572

31. Find point wise limit of the series  $\sum x^n$  ?

Find point wise limit of the series  $\sum x^n$  ?

- (1) 0 / 0
- (2) 3 / 3 : 1
- (3) 2 / 2 : 1
- (4)  $1 \times$  /  $1 \times$

**Correct Answer / सही उत्तर : (1) 0 / 0**

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

32. If a rectangle has perimeter 96 meters and its length is three times its breadth, then the area of the rectangle is ?

If a rectangle has perimeter 96 meters and its length is three times its breadth, then the area of the rectangle is ?

- (1) 436 sq. meters / 436 sq. meters
- (2) 436 cubic meters / 436 cubic meters
- (3) 432 sq. meters / 432 sq. meters
- (4) 432 cubic meters / 432 cubic meters

**Correct Answer / सही उत्तर : (3) 432 sq. meters / 432 sq. meters**

Solution / हल : Correct option: 432 sq. meters | सही विकल्प: 432 sq. meters

33. If every element of a group G is its own inverse, then G is ?

If every element of a group G is its own inverse, then G is ?

- (1) cyclic / cyclic
- (2) abelian / abelian
- (3) infinite / infinite
- (4) finite / finite

**Correct Answer / सही उत्तर : (2) abelian / abelian**

**Solution / हल :** Correct option: abelian | सही विकल्प: abelian

**34.** What is the area of ellipse whose small axis is 2 and large axis is 4?  
What is the area of ellipse whose small axis is 2 and large axis is 4?

- (1) 8 / 8
- (2) 64 / 64
- (3) 4 / 4 : 1
- (4) 16 / 16

**Correct Answer / सही उत्तर : (1) 8 / 8**

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

**35.** If the equation  $Mdx + Ndy = 0$  has one and only one solution, then the number of integrating-factor is ?  
If the equation  $Mdx + Ndy = 0$  has one and only one solution, then the number of integrating-factor is ?

- (1) Infinite / Infinite
- (2) One / एक
- (3) Two / दो (Two)
- (4) Finite / Finite

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

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

**36.** The hollow sphere, in which the circus motor cyclist performs his stunts, has a diameter of 7m. Then the area available to the motorcyclist for riding is meke& ?

The hollow sphere, in which the circus motor cyclist performs his stunts, has a diameter of 7m. Then the area available to the motorcyclist for riding is meke& ?

- (1) 59 / 59
- (2) None of these / इनमें कोई नहीं
- (3) 49 / 49%
- (4) 50 / 50

**Correct Answer / सही उत्तर : (3) 49 / 49%**

**Solution / हल :** Correct option: 49 | सही विकल्प: 49%

**37.** If a, b c are in A.P. then are 3a, 3b, 3c ?

If a, b c are in A.P. then are 3a, 3b, 3c ?

- (1) GP / GP
- (2) AP / AP
- (3) none of these / इनमें कोई नहीं
- (4) HP / HP

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

**Solution / हल :** Correct option: GP | सही विकल्प: GP

**38.** Which statement states that "Every complete metric space is of second category"?

Which statement states that "Every complete metric space is of second category"?

- (1) Baire sandwich theorem / Baire sandwich theorem
- (2) Cantor Theorem / Cantor Theorem
- (3) Baire category theorem / Baire category theorem
- (4) Fundamental theorem / Fundamental theorem

**Correct Answer / सही उत्तर : (3) Baire category theorem / Baire category theorem**

**Solution / हल :** Correct option: Baire category theorem | सही विकल्प: Baire category theorem

39. The HCF of 4052 and 12576 is ?

The HCF of 4052 and 12576 is ?

- (1) 2 / 2 : 1
- (2) 3 / 3 : 1
- (3) 4 / 4 : 1
- (4) 6 / 6

**Correct Answer / सही उत्तर : (3) 4 / 4 : 1**

**Solution / हल :** Correct option: 4 | सही विकल्प: 4 : 1

40. The area of the surface obtained by rotating the circle  $r = 2\sin \theta$  ?

The area of the surface obtained by rotating the circle  $r = 2\sin \theta$  ?

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

**Correct Answer / सही उत्तर : (2) 4 / 4 : 1**

**Solution / हल :** Correct option: 4 | सही विकल्प: 4 : 1

## SECTION B - PHYSICS / खण्ड B - भौतिक विज्ञान

41. The graph between square of time period and length of a simple pendulum is ?

The graph between square of time period and length of a simple pendulum is ?

- (1) Hyperbola / Hyperbola
- (2) Parabola / Parabola
- (3) Straight line / Straight line
- (4) Circle / Circle

**Correct Answer / सही उत्तर : (3) Straight line / Straight line**

**Solution / हल :** Correct option: Straight line | सही विकल्प: Straight line

42. The instrument used to measure optical rotation is known as ?

The instrument used to measure optical rotation is known as ?

- (1) Polarimeter / Polarimeter
- (2) Interferometer / Interferometer
- (3) Spectrometer / Spectrometer
- (4) Microscope / Microscope

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

**Solution / हल :** Correct option: Polarimeter | सही विकल्प: Polarimeter

43. Water rises to a height of 10 cm in a capillary. Mercury falls to a depth of 3.42 cm in same capillary. If the relative density of mercury is 13.6 g/cc and its angle of contact is  $135^\circ$ , the ratio of surface tension of water and mercury is ?

Water rises to a height of 10 cm in a capillary. Mercury falls to a depth of 3.42 cm in same capillary. If the relative density of mercury is 13.6 g/cc and its angle of contact is  $135^\circ$ , the ratio of surface tension of water and mercury is ?

- (1) 0.15 / 0.15
- (2) 0.10 / 0.10
- (3) 0.20 / 0.20
- (4) 0.05 / 0.05

**Correct Answer / सही उत्तर : (1) 0.15 / 0.15**

**Solution / हल :** Correct option: 0.15 | सही विकल्प: 0.15

44. A body of mass 1 kg is suspended from a string of length 1 meter. The body is rotated in a vertical circle with constant speed 2 m/s. The tension of the string when it is horizontal is ?

A body of mass 1 kg is suspended from a string of length 1 meter. The body is rotated in a vertical circle with constant speed 2 m/s. The tension of the string when it is horizontal is ?

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

**Correct Answer / सही उत्तर : (4) 4N / 4N**

**Solution / हल :** Correct option: 4N | सही विकल्प: 4N

45. A faulty thermometer has its fixed points marked as 5C and 95C. The temperature of a body as measured by the faulty thermometer is . 59C What is the correct temperature of the body on Celsius scale?  
A faulty thermometer has its fixed points marked as 5C and 95C. The temperature of a body as measured by the faulty thermometer is . 59C What is the correct temperature of the body on Celsius scale?

- (1) 56.05C / 56.05C
- (2) 62.1C / 62.1C
- (3) 59C / 59C
- (4) 60C / 60C

**Correct Answer / सही उत्तर : (4) 60C / 60C**

**Solution / हल :** Correct option: 60C | सही विकल्प: 60C

46. Which of the following produces magnetic field?  
Which of the following produces magnetic field?

- (1) Electric dipole / Electric dipole
- (2) Diamagnetic substance / Diamagnetic substance
- (3) Force / Force
- (4) Time varying field / Time varying field

**Correct Answer / सही उत्तर : (4) Time varying field / Time varying field**

**Solution / हल :** Correct option: Time varying field | सही विकल्प: Time varying field

47. A heat engine is operating between temperatures 500 K and 400 K. What is the efficiency of the engine?

A heat engine is operating between temperatures 500 K and 400 K. What is the efficiency of the engine?

- (1) 0.80 / 0.80
- (2) 0.20 / 0.20
- (3) 0.50 / 0.50
- (4) 1.25 / 12.5%

**Correct Answer / सही उत्तर : (2) 0.20 / 0.20**

**Solution / हल :** Correct option: 0.20 | सही विकल्प: 0.20

48. The surface tension of a liquid ?  
The surface tension of a liquid ?

- (1) Decreases with surface area / Decreases with surface area
- (2) Increases with temperature / Increases with temperature
- (3) Increases with surface area / Increases with surface area
- (4) Decreases with temperature / Decreases with temperature

**Correct Answer / सही उत्तर : (4) Decreases with temperature / Decreases with temperature**

**Solution / हल :** Correct option: Decreases with temperature | सही विकल्प: Decreases with temperature

49. The best filter used in a power supply is ?

The best filter used in a power supply is ?

- (1) Capacitor input filter / Capacitor input filter
- (2) L section filter / L section filter
- (3)  $\pi$  section filter /  $\pi$  section filter
- (4) Choke input filter / Choke input filter

**Correct Answer / सही उत्तर : (3)  $\pi$  section filter /  $\pi$  section filter**

**Solution / हल :** Correct option:  $\pi$  section filter | सही विकल्प:  $\pi$  section filter

50. The Maxwell's field equation  $\nabla \times B = \mu J$  represents ?

The Maxwell's field equation  $\nabla \times B = \mu J$  represents ?

- (1) Lenz's Law / Lenz's Law
- (2) Ampere's Law / Ampere's Law
- (3) Gauss's Law / Gauss's Law
- (4) Faraday's Law / Faraday's Law

**Correct Answer / सही उत्तर : (2) Ampere's Law / Ampere's Law**

**Solution / हल :** Correct option: Ampere's Law | सही विकल्प: Ampere's Law

51. When a monochrome light passes from vacuum to a material and vice-versa, which of the following characteristics of the light beam does not change ?

When a monochrome light passes from vacuum to a material and vice-versa, which of the following characteristics of the light beam does not change ?

- (1) velocity / velocity
- (2) wavelength / तरंगदैर्घ्य
- (3) frequency / frequency
- (4) intensity / intensity

**Correct Answer / सही उत्तर : (3) frequency / frequency**

**Solution / हल :** Correct option: frequency | सही विकल्प: frequency

52. Faraday law of electromagnetic induction in Universal form is -  $\nabla \times E = -\dot{B}$  ?

Faraday law of electromagnetic induction in Universal form is -  $\nabla \times E = -\dot{B}$  ?

- (1)  $\text{curl} H = j + \dot{D}$  /  $\text{curl} H = j + \dot{D}$
- (2)  $\text{curl} E = -\dot{B}$  /  $\text{curl} E = -\dot{B}$
- (3)  $\nabla \cdot B = 0$  /  $\nabla \cdot B = 0$
- (4)  $\text{div} E = \rho$  /  $\text{div} E = \rho$

**Correct Answer / सही उत्तर : (2)  $\text{curl} E = -\dot{B}$  /  $\text{curl} E = -\dot{B}$**

**Solution / हल :** Correct option:  $\text{curl} E = -\dot{B}$  | सही विकल्प:  $\text{curl} E = -\dot{B}$

53. A circular coil of radius 'r' carrying current 'i', is placed in uniform magnetic field of intensity 'B', such that its plane is perpendicular to B. The magnetic force acting on the coil is ?

A circular coil of radius 'r' carrying current 'i', is placed in uniform magnetic field of intensity 'B', such that its plane is perpendicular to B. The magnetic force acting on the coil is ?

- (1)  $irB$  /  $irB$
- (2) zero / शून्य
- (3)  $\pi irB$  /  $\pi irB$
- (4)  $2\pi irB$  /  $2\pi irB$

**Correct Answer / सही उत्तर : (2) zero / शून्य**

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

54. Which of the following gives Doppler's frequency shift  $\nu' - \nu$  ?

Which of the following gives Doppler's frequency shift  $\nu' - \nu$  ?

- (1)  $\nu / V$
- (2)  $\nu / V$
- (3)  $\nu / V$

(4)  $V_c v 2 v / V_c v 2 v$

**Correct Answer / सही उत्तर : (1)  $v / V$**

**Solution / हल :** Correct option:  $v$  | सही विकल्प:  $v$

**55.** In case of diffraction due to an opaque circular disc, the centre of the shadow is always ?  
In case of diffraction due to an opaque circular disc, the centre of the shadow is always ?

- (1) bright / bright
- (2) coloured / coloured
- (3) dark / dark
- (4) none of the above / इनमें कोई नहीं

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

**Solution / हल :** Correct option: bright | सही विकल्प: bright

**56.** For simple harmonic motion, the displacement 'x' of oscillating particle and force 'F' acting on it are related by:  $1 kx^2$  ?

For simple harmonic motion, the displacement 'x' of oscillating particle and force 'F' acting on it are related by:  $1 kx^2$  ?

- (1)  $F = 2 k^2 / F = 2 k^2$
- (2)  $F = k x / F = k x$
- (3)  $F = kx x / F = kx x$
- (4)  $F = / F =$

**Correct Answer / सही उत्तर : (3)  $F = kx x / F = kx x$**

**Solution / हल :** Correct option:  $F = kx x$  | सही विकल्प:  $F = kx x$

**57.** Which of the following pairs have same dimensions?  
Which of the following pairs have same dimensions?

- (1) Work and torque / Work and torque
- (2) Torque and force 1 2 are / Torque and force 1 2 are
- (3) Force and potential energy / Force and potential energy
- (4) Energy and power / Energy and power

**Correct Answer / सही उत्तर : (1) Work and torque / Work and torque**

**Solution / हल :** Correct option: Work and torque | सही विकल्प: Work and torque

**58.** When a copper ball is heated, the largest percentage increase will occur in its ?  
When a copper ball is heated, the largest percentage increase will occur in its ?

- (1) Area / Area
- (2) Diameter / Diameter
- (3) Density / घनत्व
- (4) Volume / आयतन

**Correct Answer / सही उत्तर : (4) Volume / आयतन**

**Solution / हल :** Correct option: Volume | सही विकल्प: आयतन

**59.** Which of the following phenomenon is not concerned with the production of polarised light?  
Which of the following phenomenon is not concerned with the production of polarised light?

- (1) Double refraction / Double refraction
- (2) Dispersion / परिक्षेपण
- (3) Scattering / Scattering
- (4) Brewster's law / Brewster's law

**Correct Answer / सही उत्तर : (2) Dispersion / परिक्षेपण**

**Solution / हल :** Correct option: Dispersion | सही विकल्प: परिक्षेपण

**60.** Which of the following is not a thermo dynamical variable ?  
Which of the following is not a thermo dynamical variable ?

- (1) Internal Energy / Internal Energy
- (2) Temperature / ताप
- (3) Enthalpy / Enthalpy
- (4) Heat / Heat

**Correct Answer / सही उत्तर : (4) Heat / Heat**

**Solution / हल :** Correct option: Heat | सही विकल्प: Heat

## SECTION C - CHEMISTRY / खण्ड C - रसायन विज्ञान

**61. Which of the following is not a dicarboxylic acid?**  
निम्नलिखित में कौन डाइकार्बोक्सिलिक अम्ल नहीं है ?

- (1) Malonic acid / मैलोनिक अम्ल
- (2) Succinic acid / सक्सिनिक अम्ल
- (3) Glutamic acid / ग्लूटामिक अम्ल
- (4) Butyric acid / ब्यूटिरिक अम्ल

**Correct Answer / सही उत्तर : (4) Butyric acid / ब्यूटिरिक अम्ल**

**Solution / हल :** Butyric acid is a monocarboxylic acid, not a dicarboxylic acid. | ब्यूटिरिक अम्ल एककार्बोक्सिलिक है, डाइकार्बोक्सिलिक नहीं।

**62. Poly oxy methylene is formed from monomers unit ?**  
पॉली ऑक्सी मेथिलीन किस एकलक से बनता है ?

- (1) Caprolactum / कैप्रोलैक्टम
- (2) Tetrahydro furan / टेट्राहाइड्रोफ्यूरान
- (3) Trioxane / ट्रायोक्सेन
- (4) Ethylene oxide / एथिलीन ऑक्साइड

**Correct Answer / सही उत्तर : (3) Trioxane / ट्रायोक्सेन**

**Solution / हल :** Polyoxymethylene is formed from trioxane. | पॉली ऑक्सी मेथिलीन ट्रायोक्सेन से बनता है।

**63. For a given reaction  $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$  अभिक्रिया के लिए अनुकूल दशा कौन-सी है ?**

- (1) High temperature, high pressure / उच्च ताप, उच्च दाब
- (2) Low temperature, low pressure / निम्न ताप, निम्न दाब
- (3) High temperature, low pressure / उच्च ताप, निम्न दाब
- (4) Low temperature, high pressure / निम्न ताप, उच्च दाब

**Correct Answer / सही उत्तर : (4) Low temperature, high pressure / निम्न ताप, उच्च दाब**

**Solution / हल :** For  $N_2+3H_2$ , low temperature and high pressure favour  $NH_3$ . |  $N_2+3H_2$  हेतु निम्न ताप व उच्च दाब  $NH_3$  के अनुकूल हैं।

**64. The revised metric system was proposed by: ceeref ?**  
The revised metric system was proposed by: ceeref ?

- (1) International Organization for Standardization / ISO
- (2) National Institute of Standards and Technology / NIST
- (3) U.S. Metric Association / U.S. मीट्रिक संघ
- (4) General Conference on Weights and Measures / भार व माप पर सामान्य सम्मेलन

**Correct Answer / सही उत्तर : (4) General Conference on Weights and Measures / भार व माप पर सामान्य सम्मेलन**

**Solution / हल :** Correct option: General Conference on Weights and Measures | सही विकल्प: भार व माप पर सामान्य सम्मेलन

**65. Which of the following has highest pKa values?**  
निम्नलिखित में किसका pKa मान सबसे अधिक है ?

- (1) Difluoro acetic acid / डाइफ्लोरोएसीटिक अम्ल
- (2) Acetic acid / एसीटिक अम्ल
- (3) Trifluoro acetic acid / ट्राइफ्लोरोएसीटिक अम्ल
- (4) Fluoroacetic acid / फ्लोरोएसीटिक अम्ल

**Correct Answer / सही उत्तर : (2) Acetic acid / एसीटिक अम्ल**

**Solution / हल :** Acetic acid has the highest pKa (weakest among the set). | एसीटिक अम्ल का pKa सबसे अधिक (सबसे दुर्बल) है।

**66.** A semi permeable membrane used in the measurement of osmotic pressure of a solution allows the passage of leesue ?

परासरण दाब मापन में प्रयुक्त अर्धपारगम्य झिल्ली किसे जाने देती है ?

- (1) solute molecules through is / केवल विलेय अणु
- (2) none of the above / इनमें कोई नहीं
- (3) solvent molecules through it / केवल विलायक अणु
- (4) both solvent and solute molecules through is / विलायक व विलेय दोनों

**Correct Answer / सही उत्तर : (3) solvent molecules through it / केवल विलायक अणु**

**Solution / हल :** The semipermeable membrane allows only solvent molecules. | अर्धपारगम्य झिल्ली केवल विलायक अणुओं को जाने देती है।

**67.** Gold number is the index for ieesu[ vebyej ?

गोल्ड संख्या किसका सूचकांक है ?

- (1) protective power of lyophobic colloid / द्रवविरोधी कोलॉइड की रक्षात्मक शक्ति
- (2) number of atoms present in one g of gold / 1 ग्राम स्वर्ण में परमाणुओं की संख्या
- (3) electroplated gold / विद्युतलेपित स्वर्ण
- (4) protective power of lyophilic colloids / द्रवरागी कोलॉइड की रक्षात्मक शक्ति

**Correct Answer / सही उत्तर : (4) protective power of lyophilic colloids / द्रवरागी कोलॉइड की रक्षात्मक शक्ति**

**Solution / हल :** Gold number indicates the protective power of lyophilic colloids. | गोल्ड संख्या द्रवरागी कोलॉइड की रक्षात्मक शक्ति दर्शाती है।

**68.** Catalysts functionalised with siloxane anchors can be attached to SiO nano particles via [Si]- 2 ?

साइलॉक्सेन एंकर युक्त उत्प्रेरक SiO<sub>2</sub> नैनोकणों से जुड़ने का लाभ क्या है ?

- (1) Achieving better catalytic yield / बेहतर उत्प्रेरक उपज
- (2) Relatively easy separability of catalyst / उत्प्रेरक का अपेक्षाकृत आसान पृथक्करण
- (3) Decreasing the reactivity of a reaction / अभिक्रिया की क्रियाशीलता घटाना
- (4) Enhancing reactivity of Nanoparticles / नैनोकणों की क्रियाशीलता बढ़ाना

**Correct Answer / सही उत्तर : (2) Relatively easy separability of catalyst / उत्प्रेरक का अपेक्षाकृत आसान पृथक्करण**

**Solution / हल :** Siloxane-anchored catalysts on SiO<sub>2</sub> allow easy catalyst separation. | SiO<sub>2</sub> पर साइलॉक्सेन-एंकर उत्प्रेरक से उत्प्रेरक आसानी से पृथक होता है।

**69.** In the reaction CH<sub>3</sub>COONa+NaOH (in 3 presence of CaO and heat)

CH<sub>3</sub>COONa + NaOH (CaO व ऊष्मा सहित) अभिक्रिया में क्या बनता है ?

- (1) CH<sub>4</sub> ; Na<sub>2</sub>CO<sub>3</sub> / CH<sub>4</sub> ; Na<sub>2</sub>CO<sub>3</sub>
- (2) C<sub>2</sub>H<sub>2</sub>OH ; Na<sub>2</sub>CO<sub>3</sub> / C<sub>2</sub>H<sub>2</sub>OH ; Na<sub>2</sub>CO<sub>3</sub>
- (3) CH<sub>3</sub>COOH ; Na<sub>2</sub>CO<sub>3</sub> / CH<sub>3</sub>COOH ; Na<sub>2</sub>CO<sub>3</sub>
- (4) CH<sub>4</sub> ; Na<sub>2</sub>CO<sub>3</sub> / CH<sub>4</sub> ; Na<sub>2</sub>CO<sub>3</sub>

**Correct Answer / सही उत्तर : (1) CH<sub>4</sub> ; Na<sub>2</sub>CO<sub>3</sub> / CH<sub>4</sub> ; Na<sub>2</sub>CO<sub>3</sub>**

**Solution / हल :** CH<sub>3</sub>COONa + NaOH/CaO gives CH<sub>4</sub> and Na<sub>2</sub>CO<sub>3</sub> (decarboxylation). | CH<sub>3</sub>COONa + NaOH/CaO से CH<sub>4</sub> व Na<sub>2</sub>CO<sub>3</sub> बनते हैं (विकारबोक्सिलीकरण)।

70. The rate determining step in any reaction is \_\_\_\_\_ ?

किसी अभिक्रिया में दर-निर्धारक चरण कौन-सा होता है ?

- (1) The first step / प्रथम चरण
- (2) The fastest step / सबसे तेज़ चरण
- (3) The slowest step / सबसे धीमा चरण
- (4) Not determinable / निर्धारित नहीं

**Correct Answer / सही उत्तर : (3) The slowest step / सबसे धीमा चरण**

**Solution / हल :** The rate-determining step is the slowest step. | दर-निर्धारक चरण सबसे धीमा चरण होता है।

71. Ruff degradation place in the presence ?

Ruff degradation place in the presence ?

- (1)  $\text{Fe}^{2+}$  /  $\text{Fe}^{2+}$
- (2)  $\text{Fe}^{3+}$  /  $\text{Fe}^{3+}$
- (3)  $\text{Mn}^{2+}$  /  $\text{Mn}^{2+}$
- (4)  $\text{Mg}^{2+}$  /  $\text{Mg}^{2+}$

**Correct Answer / सही उत्तर : (2)  $\text{Fe}^{3+}$  /  $\text{Fe}^{3+}$**

**Solution / हल :** Correct option:  $\text{Fe}^{3+}$  | सही विकल्प:  $\text{Fe}^{3+}$

72. Drugs that inhibit the growth of bacteria and kill bacterial, respectively, are called : oJeeSb pees peerJeeCegDeeW ?

जीवाणु की वृद्धि रोकने व जीवाणु मारने वाली औषधियाँ क्रमशः क्या कहलाती हैं ?

- (1) Bactericidal, Bacteriostatic / बैक्टीरिसाइडल, बैक्टीरियोस्टैटिक
- (2) Both are called Bactericidal / दोनों बैक्टीरिसाइडल
- (3) Both are called Bacteriostatic / दोनों बैक्टीरियोस्टैटिक
- (4) Bacteriostatic, Bactericidal / बैक्टीरियोस्टैटिक, बैक्टीरिसाइडल

**Correct Answer / सही उत्तर : (4) Bacteriostatic, Bactericidal / बैक्टीरियोस्टैटिक, बैक्टीरिसाइडल**

**Solution / हल :** Drugs that inhibit growth are bacteriostatic; those that kill are bactericidal. | वृद्धि रोकने वाली बैक्टीरियोस्टैटिक व मारने वाली बैक्टीरिसाइडल कहलाती हैं।

73. A transition for which first derivative of the chemical potential with respect to temperature at constant pressure is discontinuous is classified ?

वह संक्रमण जिसमें स्थिर दाब पर ताप के सापेक्ष रासायनिक विभव का प्रथम अवकलज असंतत होता है, किस श्रेणी का है ?

- (1) Second order phase transition / द्वितीय कोटि प्रावस्था संक्रमण
- (2) Lambda transition / लैम्ब्डा संक्रमण
- (3) Zero order phase transition / शून्य कोटि प्रावस्था संक्रमण
- (4) First order phase transition / प्रथम कोटि प्रावस्था संक्रमण

**Correct Answer / सही उत्तर : (4) First order phase transition / प्रथम कोटि प्रावस्था संक्रमण**

**Solution / हल :** A discontinuous first derivative of chemical potential => first-order phase transition. | रासायनिक विभव का असंतत प्रथम अवकलज => प्रथम कोटि प्रावस्था संक्रमण।

74. In basic solution,  $\text{Cl}_2$  disproportionates to?

क्षारीय विलयन में  $\text{Cl}_2$  का असमानुपातन किसमें होता है ?

- (1) Both  $\text{ClO}^-$  and  $\text{Cl}^-$  /  $\text{ClO}^-$  व  $\text{Cl}^-$  दोनों
- (2)  $\text{Cl}^-$  and  $\text{Cl}_2$  /  $\text{Cl}^-$  व  $\text{Cl}_2$
- (3)  $\text{ClO}^-$  /  $\text{ClO}^-$
- (4)  $\text{ClO}^-$  and  $\text{Cl}^-$  /  $\text{ClO}^-$  व  $\text{Cl}^-$

**Correct Answer / सही उत्तर : (4)  $\text{ClO}^-$  and  $\text{Cl}^-$  /  $\text{ClO}^-$  व  $\text{Cl}^-$**

**Solution / हल :** In basic solution  $\text{Cl}_2$  disproportionates to  $\text{ClO}^-$  and  $\text{Cl}^-$ . | क्षारीय विलयन में  $\text{Cl}_2$  का असमानुपातन  $\text{ClO}^-$  व  $\text{Cl}^-$  देता है।

75. The geometry of stannic chloride ?  
स्टैनिक क्लोराइड की ज्यामिति क्या है ?

- (1) tetrahedral / चतुष्फलकीय
- (2) square pyramidal / वर्ग पिरामिडीय
- (3) octahedral / अष्टफलकीय
- (4) square planar / वर्ग समतलीय

**Correct Answer / सही उत्तर : (1) tetrahedral / चतुष्फलकीय**

**Solution / हल :** Stannic chloride ( $\text{SnCl}_4$ ) is tetrahedral. | स्टैनिक क्लोराइड ( $\text{SnCl}_4$ ) चतुष्फलकीय है।

76. Among the following elements, which has the highest ionization energy?  
निम्नलिखित तत्वों में किसकी आयनन ऊर्जा सर्वाधिक है ?

- (1) Nitrogen / नाइट्रोजन
- (2) Molybdenum / मॉलिब्डेनम
- (3) Neon / नियॉन
- (4) Chromium / क्रोमियम

**Correct Answer / सही उत्तर : (3) Neon / नियॉन**

**Solution / हल :** Neon has the highest ionization energy among these. | इनमें नियॉन की आयनन ऊर्जा सर्वाधिक है।

77. Which of the following has the lowest bond angle?  
निम्नलिखित में किसका बंध कोण सबसे कम है ?

- (1)  $\text{NH}_3$  /  $\text{NH}_3$
- (2)  $\text{NH}_2^-$  /  $\text{NH}_2^-$
- (3)  $\text{NH}_4^+$  /  $\text{NH}_4^+$
- (4)  $\text{CH}_4$  /  $\text{CH}_4$

**Correct Answer / सही उत्तर : (2)  $\text{NH}_2^-$  /  $\text{NH}_2^-$**

**Solution / हल :**  $\text{NH}_2^-$  has the lowest bond angle among these. | इनमें  $\text{NH}_2^-$  का बंध कोण सबसे कम है।

78. Zr and Hf have almost identical atomic radii because of ?  
 $\text{Zr}$  और  $\text{Hf}$  के परमाणु त्रिज्या लगभग समान क्यों होते हैं ?

- (1) Lanthanide contraction / लैंथेनाइड संकुचन
- (2) d-block contraction / d-ब्लॉक संकुचन
- (3) Both are transition elements / दोनों संक्रमण तत्व
- (4) Both belong to the same group / दोनों एक ही वर्ग के

**Correct Answer / सही उत्तर : (1) Lanthanide contraction / लैंथेनाइड संकुचन**

**Solution / हल :** Zr and Hf have similar radii due to lanthanide contraction. | लैंथेनाइड संकुचन के कारण  $\text{Zr}$  व  $\text{Hf}$  के त्रिज्या समान होते हैं।

79. Which of the following participates fast in  $\text{SN}_2$  mechanism?  
 $\text{SN}_2$  तंत्र में निम्नलिखित में कौन तेज़ भाग लेता है ?

- (1)  $\text{R-Cl}$  /  $\text{R-Cl}$
- (2)  $\text{R-Br}$  /  $\text{R-Br}$
- (3)  $\text{R-I}$  /  $\text{R-I}$
- (4)  $\text{R-F}$  /  $\text{R-F}$

**Correct Answer / सही उत्तर : (3)  $\text{R-I}$  /  $\text{R-I}$**

**Solution / हल :**  $\text{R-I}$  reacts fastest in  $\text{SN}_2$  (best leaving group). |  $\text{SN}_2$  में  $\text{R-I}$  सबसे तेज़ (सर्वोत्तम लीविंग समूह)।

80. Which of the following statements is correct?  
निम्नलिखित में कौन-सा कथन सही है ?

- (1) Bromination is more selective than Chlorination / ब्रोमीनीकरण क्लोरीनीकरण से अधिक चयनात्मक
- (2) Bromination is less selective / ब्रोमीनीकरण कम चयनात्मक

(3) Chlorination is more selective than bromination / क्लोरीनीकरण ब्रोमीनीकरण से अधिक चयनात्मक

(4) Both are equally selective / दोनों समान चयनात्मक

**Correct Answer / सही उत्तर : (1) Bromination is more selective than Chlorination / ब्रोमीनीकरण क्लोरीनीकरण से अधिक चयनात्मक**

**Solution / हल :** Bromination is more selective than chlorination. | ब्रोमीनीकरण क्लोरीनीकरण से अधिक चयनात्मक है।

**81.** Which of the following is the end product when benzene is treated with excess of chlorine in presence of light?

प्रकाश की उपस्थिति में बेन्जीन को अधिक क्लोरीन से अभिकृत करने पर अंतिम उत्पाद क्या बनता है ?

(1) Trichlorobenzene / ट्राइक्लोरोबेन्जीन

(2) Dichlorobenzene / डाइक्लोरोबेन्जीन

(3) Monochlorobenzene / मोनोक्लोरोबेन्जीन

(4) Hexachlorocyclohexane / हेक्साक्लोरोसाइक्लोहेक्सेन

**Correct Answer / सही उत्तर : (4) Hexachlorocyclohexane / हेक्साक्लोरोसाइक्लोहेक्सेन**

**Solution / हल :** Benzene with excess chlorine in light gives hexachlorocyclohexane (BHC). | प्रकाश में अधिक क्लोरीन से बेन्जीन हेक्साक्लोरोसाइक्लोहेक्सेन (BHC) देता है।

**82.** Borax on heating strongly above its melting point melts to a liquid, which then solidifies to a transparent mass commonly known as borax bead. The chemical constituents of the borax bead ?

बोरेक्स को उसके गलनांक से अधिक तीव्र गर्म करने पर बनने वाले बोरेक्स बीड का रासायनिक संघटक क्या है ?

(1) sodium pyroborate / सोडियम पाइरोबोरेट

(2) a mixture of sodium metaborate and sodium pyroborate / सोडियम मेटाबोलाइट और सोडियम पाइरोबोरेट का मिश्रण

(3) a mixture of boric anhydride and boric acid / बोरिक एनहाइड्राइड और बोरिक अम्ल का मिश्रण

(4) a mixture of sodium metaborate and boric anhydride / सोडियम मेटाबोरेट और बोरिक एनहाइड्राइड का मिश्रण

**Correct Answer / सही उत्तर : (4) a mixture of sodium metaborate and boric anhydride / सोडियम मेटाबोरेट और बोरिक एनहाइड्राइड का मिश्रण**

**Solution / हल :** Borax bead is a mixture of sodium metaborate and boric anhydride. | बोरेक्स बीड सोडियम मेटाबोरेट व बोरिक एनहाइड्राइड का मिश्रण है।

**83.** On treatment with sodium hydroxide, glyoxal gives mainly sodium salt ?

सोडियम हाइड्रॉक्साइड से अभिक्रिया पर ग्लाइऑक्सल मुख्यतः किसका सोडियम लवण देता है ?

(1) glyceric acid / ग्लिसरिक अम्ल

(2) glycine / ग्लाइसीन

(3) glycolic acid / ग्लाइकोलिक अम्ल

(4) glycerol / ग्लिसरॉल

**Correct Answer / सही उत्तर : (3) glycolic acid / ग्लाइकोलिक अम्ल**

**Solution / हल :** Glyoxal with NaOH gives sodium glycolate (Cannizzaro). | ग्लाइऑक्सल + NaOH सोडियम ग्लाइकोलेट देता है (कैनिज़ारो)।

**84.** Which of the following hydrated transition metal ions is colorless?

निम्नलिखित में कौन-सा जलयोजित संक्रमण धातु आयन रंगहीन है ?

(1) Fe(II) / Fe(II)

(2) Fe(III) / Fe(III)

(3) Ti(III) / Ti(III)

(4) Ti(IV) / Ti(IV)

**Correct Answer / सही उत्तर : (4) Ti(IV) / Ti(IV)**

**Solution / हल :** Ti(IV) hydrated ion is colourless (d0). | Ti(IV) जलयोजित आयन रंगहीन है (d0)।

**85. Which of the following is a basic amino acid?**  
निम्नलिखित में कौन क्षारकीय अमीनो अम्ल है ?

- (1) Valine / वैलीन
- (2) Arginine / आर्जिनीन
- (3) Alanine / ऐलेनीन
- (4) Tyrosine / टायरोसीन

**Correct Answer / सही उत्तर : (2) Arginine / आर्जिनीन**

**Solution / हल :** Arginine is a basic amino acid. | आर्जिनीन क्षारकीय अमीनो अम्ल है।

## SECTION D - COMPUTER / खण्ड D - कंप्यूटर

**86. Which of the following function(s) is ?**

Which of the following function(s) is ?

- (1) Process management / Process management
- (2) File / File
- (3) Security management / Security management
- (4) All of these / ये सभी

**Correct Answer / सही उत्तर : (4) All of these / ये सभी**

**Solution / हल :** Correct option: All of these | सही विकल्प: ये सभी

**87. Which of the following is NOT considered as an entity in data modeling?**

Which of the following is NOT considered as an entity in data modeling?

- (1) Speed / Speed
- (2) Employee / Employee
- (3) Cars / Cars
- (4) Books / Books

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

**Solution / हल :** Correct option: Speed | सही विकल्प: Speed

**88. Which among the following are the components of CPU?**

Which among the following are the components of CPU?

- (1) RAM and ROM / RAM and ROM
- (2) ALU and Registers / ALU and Registers
- (3) ALU and Control / ALU and Control
- (4) ALU and / ALU and

**Correct Answer / सही उत्तर : (3) ALU and Control / ALU and Control**

**Solution / हल :** Correct option: ALU and Control | सही विकल्प: ALU and Control

**89. The Excess-3 code of decimal 2 is oMeceueJe 2 ?**

दशमलव 2 का Excess-3 कोड क्या है ?

- (1) 0011 / 0011
- (2) 1100 / 1100
- (3) 1010 / 1010
- (4) 0101 / 0101

**Correct Answer / सही उत्तर : (4) 0101 / 0101**

**Solution / हल :** Excess-3 code of decimal 2 is 0101. | दशमलव 2 का Excess-3 कोड 0101 है।

**90. For a memory of size 64K words with each word storing 8 bits, the size of Memory Data Register (MDR) is ?**

For a memory of size 64K words with each word storing 8 bits, the size of Memory Data Register (MDR) is ?

- (1) 16 bits / 16 bits
- (2) 64 bits / 64 bits
- (3) 32 bits / 32 bits
- (4) 8 bits / 8 bits

**Correct Answer / सही उत्तर : (4) 8 bits / 8 bits**

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

91. Operating System is one of the best example of: Dee@hejsef ?  
Operating System is one of the best example of: Dee@hejsef ?

- (1) application software / application software
- (2) (Firmware) / (Firmware)
- (3) adware / adware
- (4) system software / system software

**Correct Answer / सही उत्तर : (4) system software / system software**

**Solution / हल :** Correct option: system software | सही विकल्प: system software

92. Which of the following is not a part of auxiliary memories in a computer system?  
निम्नलिखित में कौन सहायक मेमोरी का भाग नहीं है ?

- (1) PROM / PROM
- (2) Floppy / फ्लॉपी
- (3) CD-ROM / CD-ROM
- (4) Magnetic tapes / चुंबकीय टेप

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

**Solution / हल :** PROM is not part of auxiliary memory. | PROM सहायक मेमोरी का भाग नहीं है।

93. When a computer virus attaches itself to another computer program, it is known as ?  
When a computer virus attaches itself to another computer program, it is known as ?

- (1) Host program / Host program
- (2) Trojan horse / Trojan horse
- (3) Backward proram / Backward proram
- (4) Risky / Risky

**Correct Answer / सही उत्तर : (2) Trojan horse / Trojan horse**

**Solution / हल :** Correct option: Trojan horse | सही विकल्प: Trojan horse

94. Which of the following components of CPU temporarily stores data for ALU operations?  
Which of the following components of CPU temporarily stores data for ALU operations?

- (1) Registers / Registers
- (2) Random Access Memory / रैंडम एक्सेस मेमोरी
- (3) Control Unit / कंट्रोल यूनिट
- (4) Arithmetic and Logic Unit / Arithmetic and Logic Unit

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

**Solution / हल :** Correct option: Registers | सही विकल्प: Registers

95. Main Memory of a computer is also called as what?  
कंप्यूटर की मुख्य मेमोरी को और क्या कहते हैं ?

- (1) External Memory / बाह्य मेमोरी
- (2) Secondary Memory / द्वितीयक मेमोरी
- (3) Cache Memory / कैश मेमोरी
- (4) Primary Memory / प्राथमिक मेमोरी

**Correct Answer / सही उत्तर : (4) Primary Memory / प्राथमिक मेमोरी**

**Solution / हल :** Main memory is also called primary memory. | मुख्य मेमोरी को प्राथमिक मेमोरी भी कहते हैं।

## SECTION E - MENTAL ABILITY / खण्ड E - मानसिक योग्यता

96. Riya, Manasvi and Pintu start running around a circular stadium and complete one round in 24 seconds, 6 seconds and 14 seconds respectively. In how much time will they meet again at the starting point?  
रिया, मानसवी व पिंटु वृत्ताकार स्टेडियम का एक चक्कर क्रमशः 24, 6 व 14 सेकंड में पूरा करते हैं। वे पुनः प्रारंभ बिंदु पर कब मिलेंगे ?

- (1) 2 min 48 seconds / 2 मिनट 48 सेकंड
- (2) 4 min 8 seconds / 4 मिनट 8 सेकंड
- (3) 3 min 25 seconds / 3 मिनट 25 सेकंड
- (4) 1 min 32 seconds / 1 मिनट 32 सेकंड

**Correct Answer / सही उत्तर : (1) 2 min 48 seconds / 2 मिनट 48 सेकंड**

**Solution / हल :** LCM of 24,6,14 = 168 s = 2 min 48 s; they meet then. | 24,6,14 का LCM = 168 सेकंड = 2 मिनट 48 सेकंड।

97. Last year there were 610 boys in a school. The number decreased by 20 percent this year. How many girls are there in the school if the number of girls is 175 percent of the total number of boys in the school this year ?

पिछले वर्ष विद्यालय में 610 लड़के थे, इस वर्ष 20% घट गए। यदि लड़कियाँ इस वर्ष कुल लड़कों की 175% हैं, तो लड़कियाँ कितनी हैं ?

- (1) 854 / 854
- (2) 782 / 782
- (3) 848 / 848
- (4) 798 / 798

**Correct Answer / सही उत्तर : (1) 854 / 854**

**Solution / हल :** Boys this year=488; girls=175% of 488=854. | इस वर्ष लड़के=488; लड़कियाँ=488 का 175%=854।

98. Manish brought 25 kg of rice at Rs. 32 per kg and 15 kg of rice at Rs. 36 per kg. what profit did he get when he mixed the two varieties together and sold it at Rs. 40.20 per kg?

Manish brought 25 kg of rice at Rs. 32 per kg and 15 kg of rice at Rs. 36 per kg. what profit did he get when he mixed the two varieties together and sold it at Rs. 40.20 per kg?

- (1) 30% / 30
- (2) 20% / 20
- (3) 40% / 40
- (4) 25% / < 2, 5 >

**Correct Answer / सही उत्तर : (2) 20% / 20**

**Solution / हल :** Correct option: 20% | सही विकल्प: 20%

99. Wheels of diameters 7 cm and 14 cm start rolling simultaneously from X and Y, which are 1980 cm apart, towards each other in opposite directions. Both of them make the same number of revolutions per second. If both of them meet after 10 seconds, the speed of the smaller wheel is ?

Wheels of diameters 7 cm and 14 cm start rolling simultaneously from X and Y, which are 1980 cm apart, towards each other in opposite directions. Both of them make the same number of revolutions per second. If both of them meet after 10 seconds, the speed of the smaller wheel is ?

- (1) 132 cm / sec / 132 cm / sec
- (2) 66 cm / sec / 66 cm / sec
- (3) 22 cm / sec / 22 cm / sec
- (4) 44 cm / sec / 44 cm / sec

**Correct Answer / सही उत्तर : (2) 66 cm / sec / 66 cm / sec**

**Solution / हल :** Correct option: 66 cm / sec | सही विकल्प: 66 cm / sec

**100.** Find the total distance covered by boat in each upstream and downstream in 5.5 hours if the speed of boat in still water and speed of current is 31.5 km/h and 4.5 km/h respectively? (SBI Clerk Prelim-2019)  
Find the total distance covered by boat in each upstream and downstream in 5.5 hours if the speed of boat in still water and speed of current is 31.5 km/h and 4.5 km/h respectively? (SBI Clerk Prelim-2019)

- (1) 380 km / 380 km
- (2) 341 km / 341 km
- (3) 315 km / 315 km
- (4) 301 km / 301 km

**Correct Answer / सही उत्तर : (2) 341 km / 341 km**

**Solution / हल :** Correct option: 341 km | सही विकल्प: 341 km

