



IMPORTANT INSTRUCTIONS :

All Questions are compulsory. Each correct answer carries 1 marks. No negative marks, No mark is deducted if not attempted. All are single correct answers only.

Syllabus:

MATHEMATICS : Algebra & Set Theory

PHYSICS : Heat

CHEMISTRY : Mole concept

MATHEMATICS

TRACK-I

- The zero of $x^2 + 1$**
A) 1 B) -1 C) i (iota) D) does not exist
- The value of the expression $\frac{n^2}{2} + \frac{n}{2}$ when $n = 12$ is**
A) 76 B) 74 C) 78 D) 72
- If the zero of the polynomial in 'x' is $-\frac{5}{4}$, then the polynomial is**
A) $4x - 5$ B) $5x - 4$ C) $5x + 4$ D) $4x + 5$
- The third degree polynomial among the following is**
A) $2x^{3-1} + 3x^{2-1} + 5$ B) $3x^{4-1} + 2x^{3-1} + 6x^{2-1} + 8$
C) $3x^{-2-1} + 4x^{-2} + 5$ D) $2x^{5-3} + 3x^{4-3} + 7$
- Degree of $2^{2015}xyz^{17}$**
A) 2032 B) 2034 C) 2036 D) 19
- If $2x^{3m+2n} + 4x^{5m+2n} + 2x^{m+n}$ is a polynomial, then its degree when $m = 2$ and $n = 1$ is**
A) 11 B) 13 C) 12 D) 14

7. If $\frac{n(n+1)(2n+1)}{6}$ represents sum of the squares of first 'n' natural numbers, then its value when $n = 10$ is
- A) 365 B) 375 C) 395 D) 385
8. If $a^3x^2 + a^2x + a$ is a polynomial, then its value at $x = \frac{2}{a}$ is
- A) $7a^2$ B) $7a + 3$ C) $7a + 2$ D) $7a$
9. Among the following the expression which is not a monomial is
- A) $\frac{4a^3b^2c^5}{23}$ B) $-147x^3y^2$ C) $\frac{2}{7}x^{-2}y^5z$ D) $x^3y^5z^{12}$
10. Given $n^2 \frac{(n+1)^2}{4}$ is a polynomial. If the value of the polynomial is 225, then n is
- A) 4 B) 6 C) 5 D) 8
11. If $\frac{1}{2}x - \frac{1}{3}x = A$ and $\frac{1}{3}x - \frac{1}{4}x = B$, then $A - B$ is
- A) $\frac{1}{12}x$ B) $-\frac{1}{12}x$ C) $-2x$ D) 0
12. If $2x - 3x + 5x = P$, $Q = -8x + 3x + 9x$ and $R = -8x - 6x - 7x$, then $(P + Q) - R$ is
- A) $27x$ B) $28x$ C) $29x$ D) $26x$
13. If $A - B = 9x^3 - 3x^2$ and $A = 12x^3 - 2x^2$, then B is
- A) $-3x^3 - x^2$ B) $3x^3 - x^2$ C) $3x^3 + x^2$ D) $-3x^2 + x^2$
14. If $(9x^3 - 8x^3 + 2x^3) + (4x^2 - 6x^2 - 7x^2 + 6x^2) + (-8 - 3 + 5)$ is simplified, then the resultant expression is
- A) $3x^3 - 3x^2 - 6$ B) $3x^3 + 3x^2 - 6$ C) $3x^3 + 3x^2 + 6$ D) $-3x^3 - 3x^2 - 6$

15. Assertion : Zero of $2x+3$ is $-3/2$

Reason : The zero of $ax+b$ is $-b/a$ when $-\frac{b}{a}$ when $a \neq 0$

- A) both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
- B) both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
- C) Assertion is True but the Reason is False.
- D) both Assertion & Reason are false.

TRACK-II

16. S-1 : Every empty set is finite set

S-2 : cardinal number of $\{\{\ \}\}$ is 1

Which of the above statements is correct ?

- A) S - 1 is true, S - 2 is true; S - 2 is a correct explanation of S - 1
- B) S - 1 is true, S - 2 is true; S - 2 is not a correct explanation of S - 1
- C) S - 1 is true, S - 2 is false
- D) S - 1 is false, S - 2 is true

17. Assertion : $A = \{x / x \neq x\}$ is an empty set

Reason : The cardinal number of a set is zero then the set is an empty set

- A) both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
- B) both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
- C) Assertion is True but the Reason is False.
- D) both Assertion & Reason are false.

18. The number of proper subsets of set $A = \{\{\ \}\}$

- A) 1
- B) 2
- C) 0
- D) None of these

19. If $A = \{ x : x \text{ is an integer and } -2 < x \leq 3 \}$, then set A is
 A) $\{-2, -1, 0, 1, 2, 3\}$ B) $\{-1, -1, 0, 1, 2\}$
 C) $\{-1, 0, 1, 2, 3\}$ D) $\{0, 1, 2, 3\}$
20. $A = \{x : x^2 + 9 = 0, x \in R\}$
 A) $\pm\sqrt{3}$ B) $\pm\sqrt{-3}$ C) $3i$ D) None of these
21. If $A = \{ x : x \text{ is a natural number } x < 5 \text{ and } x > 7 \}$, then set A is a/an
 A) Infinite set B) Null set C) Singleton set D) None
22. Which of the following is incorrect.
 A) A represents as a set B) A represents as a element of a set
 C) $A = \{x \neq x / x \in N\}$ is an empty set.
 D) 'e' is a rational number.
23. All equal sets are
 A) Null sets B) Proper subsets C) Equivalent sets D) None
24. $A = \{1, 2, \{1, 2\}, 3, 4, 5\}$ Which of the following is true.
 A) $1 \notin A$ B) $\{1\} \in A$ C) $\{1, 2, 3\} \subset A$ D) $\{1, 2\} \in A$
25. If $A \subseteq B$, then $A \cup B =$
 A) A B) B C) ϕ D) None of these
26. Which of the following is true.
 A) every finite set is empty set. B) every empty set is finite set
 C) $\{\{\}\}$ is an empty set D) finite set always empty set
27. If ϕ is set, then $\phi \cap \{\phi\} =$
 A) $\{\}$ B) $\{\phi\}$ C) $\{0\}$ D) None of these
28. If $A = \{1, 2, 3\}$; $B = \{1, 2, 3, 4\}$, then $A \cap B =$
 A) B B) Null set C) Singleton set D) A
29. If $A = \{x / x \text{ is a whole number, } x < 8\}$; $B = \{x / x \text{ is a prime number, } x < 8\}$, then B^c is
 A) $\{0, 1, 3, 6\}$ B) $\{0, 1, 4, 6\}$ C) $\{0, 1, 5, 6\}$ D) $\{0, 1, 4, 7\}$
30. If $x \in A - B$, then
 A) $x \notin A$ and $x \notin B$ B) $x \notin A$ and $x \in B$ C) $x \in A$ and $x \notin B$ D) $x \in A$ and $x \in B$

PHYSICS

16. Two liquids *A* and *B* are at 32°C and 24°C . When mixed in equal masses the temperature of the mixture is found to be 28°C . Their specific heats are in the ratio of
- A) 3 : 2 B) 2 : 3 C) 1 : 1 D) 4 : 3
17. The S.I. unit of heat is
- A) calorie B) joule C) joule/kg D) kg/joule
18. A metallic ball and highly stretched spring are made of the same material and have the same mass. They are heated so that they melt, the latent heat required
- A) Are the same for both B) Is greater for the ball
C) Is greater for the spring
D) For the two may or may not be the same depending upon the metal
19. If a body is at a temperature higher than the room temperature the level of mercury in the thermometer's stem
- A) falls B) remain at the same position
C) rises D) may rise or fall
20. Absolute zero on Celsius scale is
- A) 100°C B) 80°C C) -273°C D) -12°C
21. On the Fahrenheit scale, one division on the Celsius scale is equal to
- A) $\frac{100}{180}$ divisions B) $\frac{273}{180}$ divisions
C) $\frac{180}{100}$ divisions D) $\frac{100}{273}$ divisions

Assertion & Reason (Q.no 22-23)

A) both assertion and reason are true and the reason is the correct explanation of the assertion.

B) both assertion and reason are true but reason is not the correct explanation of the assertion.

C) assertion is true but reason is false.

D) the assertion and reason both are false.

22. Assertion : Fahrenheit is the smallest unit measuring temperature.

Reason : Fahrenheit was the first temperature scale used for measuring temperature.

23. Assertion : Specific heat of a body is always greater than its thermal capacity.

Reason : Thermal capacity is the required for raising temperature of unit mass of the body through unit degree.

24. Statement - A : Specific heat does not depend upon the mass of the substance.

Statement -B : Thermal capacity depends on mass of the substance.

A) Statement A is true whereas Statement B is false.

B) Statement A is false whereas Statement B is true.

C) Both the statements are true. D) Both the statements are false.

25. Which of the following is the smallest rise in temperature?

A) 1°F B) 1°R C) 1K D) 1°C

26. Express 100°F in degree celsius.

A) 37.8°C B) 40°C C) 80°C D) 32°C

27. At what temperature will the reading of a Fahrenheit thermometer be double that of a centigrade thermometer ?

A) 160° B) 150° C) 170° D) 180°

- 28. The absolute zero is the temperature at which**
A) Water freezes
B) All substances exist in solid state
C) Molecular motion ceases
D) None of the above
- 29. On centigrade scale the temperature of a body increases by 30 degrees. The increase in temperature on Fahrenheit scale is**
A) 50° B) 40° C) 30° D) 54°
- 30. A faulty centigrade thermometer is examined. The upper and lower points are found to be 99.5°C and 0.5°C respectively. What is the correct temperature if this faulty thermometer reads 15.5 ?**
A) 15.15°C B) 16.16°C C) 17.17°C D) 18.18°C

CHEMISTRY

- 36. The weight of 0.1 mole of Na_2CO_3 is**
A) 106 g B) 10.6 g C) 5.3 g D) 6.02×10^{22} g
- 37. The volume of two moles of oxygen at STP is**
A) 22.4 L B) 11.2 L C) 40 L D) 44.8 L
- 38. One gram molecule of oxygen is**
A) 16 gms of oxygen B) 32 gms of oxygen
C) 8gms of oxygen D) 1gm of oxygen
- 39. One mole of sodium represents**
A) 6.02×10^{23} atoms of sodium B) 46 gms of sodium
C) 11g of sodium D) 34.5g of sodium
- 40. 1 gram of hydrogen contains 6×10^{23} atoms. Then 4 grams of He contains**
A) 6×10^{23} atoms B) 12×10^{23} atoms
C) 24×10^{23} atoms D) 1.5×10^{23} atoms

- 41. Avogadro number is**
A) The number of atoms in one gram-atomic-weight
B) The number of molecules in one gram-molecular-weight
C) The number of atoms in 0.012 kg of C-12 D) all of these
- 42. One mole of CH₄ contains**
A) 6.02×10^{23} atoms of hydrogen B) 4gm atoms of hydrogen
C) 3g of carbon D) 1.81×10^{23} molecules of CH₄
- 43. The number of oxygen atoms present in 50g of calcium carbonate is**
A) 6.023×10^{23} B) 30.1×10^{23} C) 9.035×10^{23} D) 1.206×10^{24}
- 44. Which contains more number of molecules?**
A) 1 mole of carbon dioxide B) 4g of hydrogen
C) 33.6 litres of oxygen at STP D) 6g of helium
- 45. What is the mole percentage of O₂ in a mixture of 7g of N₂ and 8g of O₂?**
A) 25% B) 75% C) 50% D) 40%
- 46. The ratio between the number of molecules in equal masses of CH₄ and SO₂ is**
A) 1:1 B) 4:1 C) 1:4 D) 2:1
- 47. 10g of Calcium carbonate contains**
A) 10 moles of CaCO₃ B) 1 gram atom of Calcium
C) 6×10^{22} atoms of Calcium D) 0.1g of Calcium
- 48. The number of atoms present in 142g of Chlorine is**
A) 6×10^{23} B) 1.2×10^{24} C) 2.4×10^{24} D) 3.6×10^{24}
- 49. 11.2L of O₂ at STP has the same mass as**
A) 11.2L of Methane at STP B) 22.4L of Methane at STP
C) 33.6L of Methane at STP D) 44.8L of Methane at STP
- 50. Which of the following contains the least number of molecules ?**
A) 1g of hydrogen B) 2g of nitrogen
C) 4g of oxygen D) 11g of carbondioxide

IIT FOUNDATION ACADEMY

7TH CLASS :: FT-3:: KEYSHEET

