Section - A

Multiple Choice Questions (MCQ'S)

Q.1 Choose the correct answer for each from the given options.

1. An angle with measure less than 90° is called _____.
   (a) Acute angle (b) Right angle (c) Obtuse angle (d) None of these
2. A triangle having two sides congruent is called a / an _____.
   (a) Isosceles triangle (b) Scalene triangle
   (c) Equilateral triangle (d) None of these
3. The sub duplicate of 4:9 is _____.
   (a) 2 : 3 (b) 16 : 81 (c) 8 : 18 (d) 6 : 4
4. A circle which passes through three vertices of a triangle is called _____.
   (a) Escribed circle (b) Circum circle
   (c) Inscribed circle (d) None of these
5. $\tan 60^\circ =$ _____
   (a) $\sqrt{3}$ (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{2}{\sqrt{3}}$
6. The Cartesian product of set A and B written as _____.
   (a) A . B (b) A x B (c) A Δ B (d) B x A
7. $(-3, -2)$ is in _____ quadrant.
   (a) Second (b) Third (c) Fourth (d) First
8. $\log_2 x = 3$, then $x =$ _____
   (a) 6 (b) 8 (c) 10 (d) 5
9. The degree of polynomial $x^3 + xy^2 + y$ is _____.

10. The natural logarithm has base _____.

(a) 1 (b) e (c) 10 (d) 0

11. The sum of 10 observations is 125, the mean is _____.

(a) 12.5 (b) 50 (c) 75 (d) – 15

12. Solution set of $\sqrt{y-2} = -4$ is _____.

(a) 18 (b) ± 4 (c) { } (d) ± 16

13. $\sec 30^\circ$ = _____.

(a) $\frac{2}{\sqrt{3}}$ (b) $\sqrt{2}$ (c) 2 (d) 1

14. In a right angled triangle the side opposite to right angle is called _____.

(a) Perpendicular (b) Hypotenuse (c) Altitude (d) None of these

15. The measure of an angle inscribed in a semi-circle is equal to _____.

(a) 90° (b) 180° (c) 120° (d) 360°

16. $(-x)^2(-x)^3(-x)^4$ = _____.

(a) $-x^9$ (b) $-x^{24}$ (c) x^9 (d) x^{12}

17. If a : b = c : d then a : c = b : d this property of proportion is called _____.

(a) Dividendo (b) Alternado (c) Invertendo (d) Componendo

18. If $A = \begin{bmatrix} 5 & 6 \\ 3 & -1 \end{bmatrix}$, then A^t = _____.

(a) $\begin{bmatrix} 5 & 3 \\ 6 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 6 & 3 \\ 5 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 6 & 5 \\ -1 & 3 \end{bmatrix}$ (d) $\begin{bmatrix} 6 & -1 \\ 3 & 5 \end{bmatrix}$

19. Multiplicative inverse of matrix A is written as _____.

(a) A' (b) A^{-1} (c) $|A|$ (d) A

20. The L.C.M of $x^3 - y^3$ and $x^6 - y^6$ is _____.

(a) $x^3 - y^3$ (b) $x^3 + y^3$ (c) $x^6 + y^6$ (d) $x^6 - y^6$

Section – B

(Short Answers)

Note: Answer any TEN of the following questions. Each question carries 05 marks.

Q.2 If $A=\{1,2,3,4\}$ and $B=\{2,4,6,8\}$ show that $A\Delta B=(A-B)\cup(B-A)$.

Q.3 If $a=\sqrt{10}+3$, find the value of $a+\frac{1}{a}$, $a-\frac{1}{a}$ and $a^2-\frac{1}{a^2}$.

Q.4 Simplify:

(i) $\left(\frac{18x^4y^3z^2}{6ab^2c^5}\right)^3$ (ii) $\left(\frac{3a^3b^2c^6}{xyz}\right)^{-5}$

Q.5 The measure of a diameter of the moon is 3500 km. After converting if into centimeters, write if in scientific notation.

Q.6 Find the value of y:

(i) $\log_{\sqrt{5}} 25=y$ (ii) $\log_{55} 55=y$

Q.7 Find the H.C.F of the following polynomial by factor method.

$$9x^2+63x+108,\ 9x^2-45x-216 \text{ and } 18x^2+45x-27$$

Q.8 If $a+\frac{1}{a}=2$ prove that $a^2+\frac{1}{a^2}=a^4+\frac{1}{a^4}=a^3+\frac{1}{a^3}$.

Q.9 Solve if possible by using cramer's rule:

$$x+2y=6,\ 2x+7y=3$$

Q.10 A mother is 21 years older than her new born baby, How old will the baby be when her age is $\frac{1}{4}$ that her mother.

Q.11 Resolve into factors: $a^4(b^2-c^2)+b^4(c^2-a^2)+c^4(a^2-b^2)$.

Q.12 Define median. How do we calculate median for grouped data?

Q.13 What number must be added to each term of the ratio 5 : 27 to make it equal to 1 : 3.

Q.14 Find the solution set of the equation: $\sqrt{12x-4} = \sqrt{4x+8}$, and also verify the answer.

Q.15 Find the number of digit in (i) 3^{19} (ii) 9^{48}

Section – C

(Descriptive)

Note: Answer any TWO of the following questions. Each question carries 15 marks.

Q.16 (a) The product of two expression is $12x^4 - 34x^3 + 37x^2 - 17x + 5$, if one expression is $3x^2 - 7x + 5$, find the other.

(b) Factorize: $36x^2 + 154x - 36$

Q.17 (a) Using the appropriate formula, find the values:

(i) (1104 x 1104) (ii) $(98)^2$

(b) Following are the daily earning (in Rs) of ten workers:

188, 170, 172, 125, 115, 195, 181, 190, 195, 190

Calculate: (i) Arithmetic Mean (ii) Median (iii) Mode

Q.18 (a) Ali standing in a stream find that the measures of the angles of elevation of two trees, of heights 6 m and 8m, on opposite banks in the line with him are of 30° and 45°, respectively. Find the width of the stream.

(b) Define any TWO of the following terms and illustrate with figure.

(i) Tangent to the circle

(ii) Supplement Postulate

(iii) Interior and exterior of triangle.

Section – A

Multiple Choice Questions (MCQ'S)

Q.1 Choose the correct answer for each from the given options.

1. According to Einstein's Quantum Theory light travel in the from of:
   (a) Waves (b) Carpuscles (c) Energy Packets (d) None of these
2. At S.T.P pure water boils at:
   (a) 0 K (b) 100 K (c) 273 K (d) 373 K
3. S.I unit of tension in a string is:
   (a) Pound (b) Newton (c) Kilogram (d) Joule
4. Right hand rule is used to find the direction of:
   (a) Magnetic Field (b) Current
   (c) Force (d) Voltage
5. _____ is concerned with the structure and properties of an atom.
   (a) Bio-Physics (b) Plasma Physics
   (c) Atomic Physics (d) Nuclear Physics
6. Dr. Abdul Qadeer Khan contributed in making Pakistan a _____ State.
   (a) Islamic (b) Nuclear (c) Democracy (d) Welfare
7. _____ is the first equation of motion.
   (a) $V_f^2 = V_i^2 + 2aS$ (b) $V_f = V_i + at$
   (c) $S = v_i t + \frac{1}{2}at^2$ (d) $V_f^2 = V_i^2 + 2aS$
8. The capability of a force to rotate a body about a point is called _____.
   (a) Couple (b) Torque (c) Equilibrium (d) Motion

9. The mass of Earth may be determined with the help of _____ law of Universal Gravitation.

(a) Boyle's (b) Newton's (c) Charles's (d) Coulomb's

10. One form of energy can be converted into another form of energy but total amount of energy remains _____.

(a) Motion (b) Rest (c) Constant (d) None of these

11. A strong wooden or metallic bar, which can be rotated about a point is called a _____.

(a) Load (b) Effort (c) Lever (d) Fulcrum

12. The atmosphere is the blanket of air around the Earth. It extends up to about _____ above the surface of the Earth.

(a) 1000 Km (b) 1500 Km (c) 2000 Km (d) 2500 Km

13. _____ is the force that pushes an object immersed in a liquid in the upward direction.

(a) Buoyant Force (b) K.E (c) P.E (d) Viscosity

14. Heat is the form of _____.

(a) Energy (b) Work (c) Wave (d) Sound

15. A _____ is a piece of transparent material.

(a) Lens (b) Fibers (c) Wood (d) Plastics

16. The sound heard after reflection from a surface is called an _____.

(a) Echo (b) Pitch (c) Loudness (d) Quality

17. "G" is called _____

(a) Gravitational Acceleration (b) Gravitational Force

(c) Gravitational Constant (d) None of these

Section – B

(Short Answers)

Note: Answer any EIGHT of the following questions. Each question carries 05 marks.

Q.2 What is the significant work of Dr. Abdul Qadeer Khan in the field of nuclear science?

Q.3 The radius of Hydrogen atom is 0.53×10^{-10} m convert it in cm, mm, nm.

Q.4 How can we determine the mass of Earth?

Q.5 What is atmospheric pressure? How will you measure it?

Q.6 What do you mean by anomalous behavior / expansion of water? How does it help the aquatic animals to save their lives in frozen seas?

Q.7 Define reflection of light. State the laws of reflection?

Q.8 State coulomb's law and define the unit of charge.

Q.9 A body of mass 50 Kg is moving with an acceleration of 5 ms^{-2}. Find the force acting on the body.

Q.10 What is Energy? How many forms of energy?

Q.11 Differentiate between concave mirror and convex mirror.

Q.12 Derive the equation: $S = v_i t + \frac{1}{2} a t^2$

Q.13 What is meant by dispersion of light?

Section – C

(Descriptive Answers)

Note: Answer any TWO of the following questions. Each question carries 14 (7 + 7) marks.

Q.14 (a) Explain how the value of "g" decreases with a change in altitude.

(b) Determine the acceleration of a car of mass 900 Kg, when a net force of 2700 N acts on it.

Q.15 (a) Define Momentum. Explain the law of conservation of momentum with the help of example.

(b) What is the power of an engine that pulls a 1000 Kg automobile at a steady speed of 10 m/sec along a level road?

Q.16 Write notes on any TWO of the following.

Ohm's Law Thermal Expansion States of Equilibrium