COMPREHENSIVE EXAMINATION 2020
X – MATHEMATICS
(SCIENCE GROUP)

IMPORTANT INSTRUCTIONS:

This Paper consisting of Multiple Choice Questions (Section 'A') and all of them to be answered. Its total duration is 30 minutes only.

SECTION 'A' (MULTIPLE– CHOICE QUESTIONS) (Marks: 20)

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

1. (-8, -9) is in quadrant:
   *1st *2nd *3rd *4th
2. $2\sqrt{3} + 6\sqrt{3}$ =
   *$12\sqrt{3}$ *$8\sqrt{6}$ *$4\sqrt{3}$ *$8\sqrt{3}$
3. The Characteristic of log 0.00226 is:
   *$\bar{3}$ *$\bar{2}$ *3 *2
4. If $a + b = 2$ and $a - b = 2$ the value of $a^2 + b^2$ is:
   *2 *3/2 *-1 *4
5. The H.C.F. of $8x^3y^2$ and $12x^2y$ is:
   *$4x^2y$ *$96x^3y^2$ *$12x^2y$ *None of these
6. The Solution Set of $\sqrt{y-2} = -4$:
   *18 *±14 *{ } *None of these
7. If A = $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$, *then* $ad - bc$ is called:
   *Singular Matrix *Scalar Matrix *Determinant *Zero Matrix
8. The multiplicative inverse of $\frac{1}{a+b}$ is:
   *$\frac{-1}{a+b}$ *$a + b$ *$a - b$ *$\frac{-1}{a-b}$
9. If the standard deviation of series is 4, its variance is:
   *20 *36 *2 *16
10. The sum of angles of a parallelogram is:
    *240^0 *180^0 *360^0 *320^0
11. The distance of any point of a circle from its center is called its:
    *radius *diameter *chord *secant
12. The triangle having no sides congruent is called:
    *Right *Obtuse *Isosceles *Scalene
13. $\sqrt{1 - \sin^2\theta}$ =
    *$\cos\theta$ *$\tan\theta$ *$\cot\theta$ *$\sec\theta$
14. A set which contains all the sets under consideration is called:
    *Universal set *Superset *Power set *Disjoint set
15. It should be added to $x^2 + \frac{1}{x^2}$ to make it perfect square:
    *xy *x^2y^2 *2 *$2xy$
16. The degree of the Polynomial $3x^2y + 4x^2 + 5$ is:
    *2 *3 *4 *1
17. Cos 45^0 =
    *$1/\sqrt{2}$ *$\sqrt{2}$ *1 *$\frac{1}{2}$
18. The duplicate ratio of 2:3 is:
    *4:3 *4:9 *2:9 *8:27
19. The Point through which the medians of the triangle pass is called:
    *Orthocenter *Centroid *Circumcenter *Incenter
20. $(AUB)'$ =
    *$A' \cup B'$ *$A' \cup B$ *$A' \cap B'$ *None of these

COMPREHENSIVE EXAMINATION 2020
X – MATHEMATICS
(SCIENCE GROUP)

IMPORTANT INSTRUCTIONS:

This Paper consisting of Short-Answer Questions (Section 'B') and Descriptive-Answer Questions (Section 'C') is being given after 30 minutes. Its total duration is 2 ½ hours only.

SECTION 'B' (SHORT – ANSWER QUESTIONS)

(Marks: 50)

NOTE : Attempt any **TEN** Part questions from this Section. Selecting **TWO PARTS** from each Question.

1. (i) **If A = {1 , 2 , 3, 4}; B = {2 , 4 , 6 , 8} ; Prove that (A ∩ B) ∪ (B Δ A) = A U B** **OR**
If A = {a, b, c} and B = {x, y}; Find only two Binary relations in A x B? **OR**
If A = {1 , 2 , 3, 4}; B = {2 , 4 , 6 , 8} and C = {2 , 3 , 6 , 8} then find (A – B) x (B – C)?

(ii) **Simplify** $\left(\frac{x^{2a}}{x^{a+b}}\right)\left(\frac{x^{2b}}{x^{b+c}}\right)\left(\frac{x^{2c}}{x^{c+a}}\right)$ **OR** $\left(\frac{x^a}{x^b}\right)^{a+b}.\left(\frac{x^b}{x^c}\right)^{b+c} \div 4(x^c.x^a)^{a-c}$ **OR** $\sqrt{\frac{(216)^{\frac{2}{3}}(25)^{\frac{1}{2}}}{\left(\frac{1}{25}\right)^{\frac{-3}{2}}}}$

OR $\sqrt[4]{\frac{a^x}{a^y}} \times \sqrt[4]{\frac{a^y}{a^r}} \times \sqrt[4]{\frac{a^r}{a^x}}$

(iii) Find the value of the following using Log Tables: $\frac{(780.6)^{\frac{1}{2}} X \sqrt{3.000}}{4.000}$ **OR** $\frac{(85.7)\ x\ 2.47}{8.89}$ **OR** $\frac{(0.87)}{(28.9)(0.785)}$ **OR** $\frac{(6.735)(48.27)}{(16.18)^2}$

2. **(i) Find the value of x - y; If xy = 20 and x + y = -9?** **OR** If $a - \frac{1}{a} = 4$; Find the value of $a^3 - \frac{1}{a^3}$?
OR Find the value of $l^3 + m^3 + n^3 - 3lmn$; when $l + m + n = 15$ and $lm + mn + nl = 74$ **OR**
Find the value of $p^2 + \frac{1}{p^2}$; If $p = 3 + 2\sqrt{2}$ **OR** **If $x + y + z = \sqrt{7}$ and $xy + yz + zx = 2$; Find the value of $x^2 + y^2 + z^2$.**

(ii) Solve the following equations with the help of Cramer's rule?
5x - 2y = 1
2x - y = 0
OR If A = $\begin{bmatrix} -3 & -2 \\ 5 & 6 \end{bmatrix}$; *Find* A^{-1} *and Prove that* A . $A^{-1} = I$
OR **By using Matrices Method, solve the following system of equations;**
8x - 4y = 2
x + 2y = 4

(ii) For what value of 'q' $4x^4 + 12x^3 + 25x^2 + 24x + q$ will be a Perfect Square? **OR**
For what values of 'p' and 'q' $4a^4 + 12a^3 + 25a^2 + pa + q$ will be a Perfect Square? **OR**
What should be added to $4a^4 + 4a^3 + 5a^2 + 2a + 5$ to make it a Perfect Square?

3. **(i) A set of data contains the values as 148, 145, 160, 157, 156, 160, 160, 165; show that their mode > median > mean.** **OR** **A hospital is Six storeyed. The number of rooms in each storey is 11, 13, 25, 15, 12, 18, 17, 23, 20, 16. Find their standard deviation.** **OR**
Marks obtained by some students in computer science exam are given below. Find median of their numbers.

Marks.	20 - 24	25 – 29	30 – 34	35 – 39	40 – 44	45 - 49
No. of Students	25	28	32	25	13	12

OR **Find the Variance from the following information: $\bar{x} = 12.5$, $\sum x = 125$, $\sum x^2 = 6666$**
Find the variance of the data. **OR** Find factors with the help of remainder theorem $x^3 + 7x^2 + 14x + 8$

(ii) **Find all the trigonometric ratios of 60°** or 45°? **OR** **Prove that $(\cos\theta - \sin\theta)^2 + 2\sin\theta\cos\theta = 1$**
OR **Prove that:** $\frac{\sin\emptyset}{1+\cos\emptyset} + \frac{1+\cos\emptyset}{\sin\emptyset} = 2\text{cosec}\,\theta$ **OR** Prove that $\sin^2\theta + \cos^2\theta = 1$ **OR**
Prove that: $\cot\theta + \tan\beta = \cot\beta \cdot \sec^2\beta$

(iii) **Show that the Sum of measures of all angles of the triangle must be equal to 180°. OR**

If one side of a triangle is extended the exterior angle so formed is in measure greater than either of the two interior opposite angles. Prove it.

OR If a Transversal intersects two coplanar lines, such that the pair of Alternate angles formed are congruent; Prove that the lines are Parallel.

4. (i) **Eliminate 'a' from the following equations;** $a^2 + \frac{1}{a^2} = m^2$; $a^4 + \frac{1}{a^4} = b^4$ **OR**

Find the relation independent of 't' from the following equations: $x = \frac{a(1-t^2)}{1+t^2}$; $y = \frac{b(1-t^2)}{2t^2}$ **OR**

Eliminate 'y' from the following equations; $\frac{y}{b} + \frac{b}{y} = 2c$; $\frac{y^2}{b^2} + \frac{y^2}{b^2} = a^2$ **OR** **The sum of three consecutive odd numbers is 909. Find the numbers.**

(ii) **If** $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$**; Prove that :** $(a^2 + c^2 + e^2)(b^2 + d^2 + f^2) = (ab + cd + ef)^2$ **OR**

If $\frac{x}{a} = \frac{y}{b} = \frac{z}{c}$ **then prove:** $\frac{x^3}{a^2} + \frac{y^3}{b} + \frac{z^3}{c^2} = \frac{(x+y+z)^3}{(a,\ b,\ c)^2}$ **OR**

If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ then prove that $\frac{a^4b^2 + a^2e^2 - e^4f}{b^6 + b^2f^2 - f^5} = \frac{a^4}{b^4}$

(iii) **Find the solution set of the following inequation:** $\frac{x+5}{10} < \frac{25-4x}{5}$ $\forall\ x \in N$ **OR**

Find the Solution set of: $-6 + |5x - 3| = 3$ **OR** $\left|\frac{2x-1}{3}\right| - 2 = 0$ **OR** $\sqrt{4x-5} = \sqrt{3x+7}$ **OR**

Solve the equation $x^2 - x - 56 = 0$ **by using quadratic formula.**

5. (i) **A pole 14 meters high on the bank of a stream makes an angle of 30⁰ with a place on the opposite bank. Find the breadth of the stream. OR** A tree is at a distance of 50m from a point on the ground. The angle of elevation of the top of tree from this point is 30°. Find the height of tree.

(ii) **Resolve into factors:** $x^2(y - z) + y^2(z - x) + z^2(x - y)$ **OR** $4a^2(3b - 4c) + 9b^2(4c - 2a) + 16c^2(2a - 3b)$

(iii) **Congruent Chords of a circle (or congruent circles) are equidistant from their centers. Prove it.**
OR
If two tangents are drawn to a circle from a point outside it. Prove that these tangents are equal in length.

Marked with **'RED BOLD'** are the **'MOST IMPORTANT'** Questions.

- *PEC REGISTERED ENGINEER* - BE (NED UET) –
  CAREER COUNSELOR / ADMISSIONS EXPERT –
  CEO / FOUNDER (THE EDUCATIONIST HUB)
- FACEBOOK: WWW.FACEBOOK.COM/SADIQ.SALEEM32
- MOBILE / WHATSAPP: +92322-238705-6
- LINKEDIN: WWW.LINKEDIN.COM/IN/SADIQ-SALEEM-01a0867b

SECTION 'C' (DESCRIPTIVE – ANSWER QUESTIONS) (Marks: 30)

NOTE : Attempt any **THREE** questions from this Section including **Q.1 which is Compulsory**.

1. In a correspondence of two right angled triangles. If their hypotenuses are congruent and one more side of one triangle is congruent to the corresponding side of the other then prove that the two triangles are congruent.
   OR
   In a correspondence of two triangles, if one side and any two angles of one triangle are congruent to the corresponding side and angles of the other, Prove that the two triangles are congruent.

2. **Find the Solution Sets of following equations graphically. (Find four ordered pairs for each equation)**
   2x – y = 5
   x - 2y = 1

   OR

   x – 2y = -3
   2x + y = 14

   OR

   x – y = 3
   2x + y = 6

3. **(i) Prove that the perpendicular bisector of a chord of a circle passes through the center of the circle.**
   OR
   The line segment that joins the mid-points of two sides of triangle is parallel to the third side and equal to one half of its length.
   (ii) The measure of a central angle of a minor arc of a circle is double that of the inscribed angle of the corresponding major arc. OR
   If a diameter of a circle bisects a chord; prove that it is perpendicular to the chord.

4. Factorise the following:
   i. **$ax^4 - \frac{a}{16}$ OR $a^4 + 4b^4$ OR $a^8 + a^4 + 1$ OR $a^3 - a^2 + 2$**
   ii. **$(ab + cd)^2 - (ac - bd)^2$ OR $x^6 - y^6$**
   iii. **$12x^2 - 13 + 3$ OR $x^2 + 15x - 100$ OR $5x^2 - 13x - 6$ OR $x^2 - 13xy + 30y^2$**
   iv. **$(x - 2y)^3 - 64z^3$ OR $27x^3 - 1 + 8y^6 + 18xy^2$ OR $ab + amx - bx - mx^2$**
   OR $64y^6 + \frac{64}{y^6} - 8y^9 + 96y^3$

5. **Draw a triangle ABC such that m $\overline{AB}$ = 4 cm; m $\angle B = 60^0$ and m $\overline{BC}$ = 5 cm; Draw the circumcircle of the triangle. Write also the steps of construction. OR**
   Draw the transverse common tangents of the two circles with the radii with 3cm and 2cm, when the distance between their centers is 6cm. Write down the steps of construction.

---------- **BEST OF LUCK** ----------

Marked with **'RED BOLD'** are the **'MOST IMPORTANT'** Questions.

- ***PEC REGISTERED ENGINEER*** **- BE (NED UET) –**
  CAREER COUNSELOR / ADMISSIONS EXPERT –
  CEO / FOUNDER (THE EDUCATIONIST HUB)
- **FACEBOOK: WWW.FACEBOOK.COM/SADIQ.SALEEM32**
- **MOBILE / WHATSAPP: +92322-238705-6**
- **LINKEDIN: WWW.LINKEDIN.COM/IN/SADIQ-SALEEM-01a0867b**