Plk brilliants

5 marks Test
Chapter 1,2,3 and 4

CLASS: 10 **MARKS: 80**
SUB: MATHS **TIME: 2 Hrs.**
I. Answer any 16 questions: **16 x 5 = 80**

1. Let $A = \{x \in W : x < 2\}, B = \{\{x \in N : 1 < x \leq 4\}$ and $C = \{3,5\}$. Verify that $(A \cup B)XC = (AXC) \cup (BXC)$.
2. Let A = {1,2,3,7} and B = {3,0,-1,7}, which of the following are relation from A to B? (i) R_1={(2,1),(7,1)} (ii) R_2 = {(-1,1)} (iii) R_3 = {(2,-1),(7,7),(1,3)} (iv) R_4={(7,-1),(0,3),(3,3),(0,7)}.
3. Forensic scientists can determine the height (in cm) of a person based on the length of the thigh bone. They usually do so using the function h(b) = 2.47b+54.10 where b is the length of the thigh bone. (i) Verify the function h is one-one or not. (ii) Also find the height of a person if the length of his thigh bone is 50cm. (iii) Find the length of the thigh bone if the height of a person is 147.96cm.
4. A function f: $[-5,9] \to \mathbb{R}$ is defined as follows: $f(x) = \begin{cases} 6x+1; & -5 \leq x < 2 \\ 5x^2-1; & 2 \leq x < 6 \\ 3x-4; & 6 \leq x \leq 9 \end{cases}$

Find (i) f(-3) + f(2) (ii) f(7) - f(1) (iii) 2f(4) + f(8) (iv) $\frac{2f(-2)-f(6)}{f(4)+f(-2)}$.

5. Consider the functions f(x), g(x), h(x) as given below. Show that fo(goh) = (fog)oh in f(x) = x-4, g(x) = x^2 and h(x) = 3x-5.
6. Find the HCF of 396, 504, 636.
7. The houses of a street are numbered form 1 to 49. Senthil's house is numbered such that the sum of numbers of the houses prior to Senthil's house is equal to sum of numbers of houses following Senthil's house. Find Senthil's house number.
8. Find the sum to n terms of the series 5 + 55 + 555 + ...
9. Rekha has 15 squares colour papers of sizes 10cm, 11cm, 12cm,...,24cm. How much area can be decorated with these colour papers?
10. Find the sum of the series $(2^3 - 1^3) + (4^3 - 3^3) + (6^3 - 5^3) + \ldots$ to (i) n terms (ii) 8 terms.
11. Solve the following system of linear equations in three variables: 3x - 2y +z = 2, 2x + 3y - z = 5, x + y + z = 6.
12. Find the GCD of $6x^3 - 30x^2 + 60x - 48$ and $3x^3 - 12x^2 + 21x - 18$.
13. Find the square root of the expressions:$(6x^2+x-1)\ (3x^2+2x-1)\ (2x^2+3x+1)$
14. Find the values of m and n if the following polynomials are perfect squares: $36x^4-60x^3+61x^2-mx+n$.
15. A passenger train takes 1 hr more than as express train to travel a distance of 240km from Chennai to Virudhachalam. The speed of the express train is more than that of the passenger train by 20 km/hr. Find the average speed of both train?
16. The roots of the equation $2x^2-7x+5=0$ are α and β. Without solving for the roots, find (i) $\frac{1}{\alpha}+\frac{1}{\beta}$ (ii) $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$.
17. State and prove Thales theorem.
18. State and prove Pythagoras theorem.
19. P and Q are the mid-points of the sides CA and CB respectively of a triangle ABC, right angled at C. Prove that $4(AQ^2+BP^2) = 5AB^2$.
20. Show that in a triangle, the medians are concurrent.

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