PLEASURE TEST REVISION SERIES XI – 02

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Time: 180 Minutes **Max.Marks:** 60

SECTION – A (Short Answer Type)

Q01. Find the general solutions of $\sec x = 2$.

Q02. Sum of an infinite GP is 3 and sum of the squares of its term is also 3. Find the first term and common ratio.

Q03. If coefficient of $(r+1)^{th}$ term in the expansion of $(1+x)^{2n}$ be equal to that of $(r+3)^{th}$ term, then find the value of $n-r$.

Q04. Write the constant term in expansion of $\left(x^3 - \dfrac{1}{x^2}\right)^{15}$.

Q05. A die is tossed twice. What is the probability of getting a number greater than 4 on each toss?

Q06. Write $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}\right\}$ in the set-builder form. Hence state the number of subsets it can have.

Q07. Find the domain of the function: $f(x) = \dfrac{x^2+3x+5}{x^2-5x+4}$.

Q08. Solve: $3x^2 - 2x + 5 = 0$.

Q09. Evaluate: $\lim\limits_{x \to 2} \dfrac{x^2-4}{|x-2|}$, if it exists.

Q10. Write the negation of the following statement:
"The square root of every positive number is positive."

SECTION – B (Long Answer Type)

Q11. Using principle of mathematical induction, prove that $10^n + 3.4^{n+2} + 5$ is divisible by 9.

Q12. **(i)** If $B \times A = \{(1,a), (2,a), (5,a), (2,b), (5,b), (1,b)\}$ then, find the sets A and B. Hence find $A \times B$.

(ii) If $A = \{3,5,7,9,11\}$, $B = \{7,9,11,13\}$ and, $C = \{11,13,15\}$ then, find $(A \cap B) \cap (B \cup C)$.

Q13. The foot of $\perp^{er}$ from the origin to a straight line is at the point $(3,-4)$. Write the equation of line.

Q14. Find the image of $(4,-13)$ in the line $5x+y+6=0$.

Q15. Find e of an ellipse if the distance between its foci is same as the length of its latus-rectum.

Q16. If the coefficient of r^{th}, $(r+1)^{th}$ and $(r+2)^{th}$ terms in the binomial expansion of $(1+x)^{14}$ are in AP, find the value of r.

Q17. Prove that: $\cos 2x \cos\dfrac{x}{2} - \cos 3x \cos\dfrac{9x}{2} = \sin 5x \sin\dfrac{5x}{2}$.

OR If $\sin\theta = -\dfrac{4}{5}$, $\pi < \theta < \dfrac{3\pi}{2}$ then find the remaining trigonometric functions.

Q18. Find the coefficient of x^{20} in $\left(1+3x+3x^2+x^3\right)^{20}$. Also find the middle term(s).

Q19. How many words, with or without meaning, can be made from the letters of the word 'SUNDAY', assuming that no letter is repeated, if
(a) 4 letters are used at a time
(b) all letters are used at a time
(c) all letters are used but first letter is a consonant
(d) 4 letters are used at a time but first letter is a vowel?

Q20. Solve graphically: $x+2y \le 10$, $x+y \ge 1$, $x-y \le 0$, $x \ge 0$, $y \ge 0$.

Q21. A college awarded 38 medals in Football, 15 in Basketball and 20 in Cricket. If these medals went to a total of 58 men and only 3 men got medals in all the three sports, how many received medals in exactly two of the three sports?

Q22. $\mathrm{A}(1,2,3)$, $\mathrm{B}(0,4,1)$ and $\mathrm{C}(-1,-1,-3)$ are the vertices of a triangle ABC. Find the point at which the bisector of the angle $\angle\mathrm{BAC}$ meets the side BC.

SECTION – C (Very Long Answer Type)

Q23. Evaluate the given limit: $\lim\limits_{x\to 2}\dfrac{3^x+3^{3-x}-12}{3^{3-x}-3^{x/2}}$.

OR Differentiate using definition of derivatives: $\operatorname{cosec}\left(2x-\dfrac{\pi}{4}\right)$.

Q24. In the binomial expansion of $(x-y)^n, n\geq 5$, the sum of fifth and sixth terms is zero. Find the ratio of x to y.

Q25. The arithmetic mean between two nos. is A and S is the sum of n arithmetic means between the same nos. Deduce a relationship between A and S.

OR If $\dfrac{a^n+b^n}{a^{n-1}+b^{n-1}}$ is GM between a and b, find n.

Q26. The foci of a hyperbola coincide with the foci of $\dfrac{x^2}{25}+\dfrac{y^2}{9}=1$. Find the equation of hyperbola, if its eccentricity is two.

Q27. Find the polar form of the complex number: $\dfrac{-1+i}{\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}}$.

OR Find the real value(s) of θ such that $\dfrac{3+2i\sin\theta}{1-2i\sin\theta}$ is purely imaginary.

Q28. Given that $\overline{x}$ is the mean and σ^2 is the variance of n observations $x_1, x_2, ..., x_n$. Prove that the mean and variance of the observations $ax_1, ax_2, ax_3, ..., ax_n$ are $a\overline{x}$ and $a^2\sigma^2$, respectively, $(a\neq 0)$.

Q29. If 4-digit numbers greater than 5,000 are randomly formed from the digits 0, 1, 3, 5, and 7, what is the probability of forming a number divisible by 5 when,

(i) the digits are repeated? **(ii)** the repetition of digits is not allowed?

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HINTS / ANSWERS

Q01. $2n\pi \pm \frac{\pi}{3}, n \in Z$ **Q02.** 3/2, ½ **Q03.** 1 **Q04.** $-{}^{15}C_9$

Q05. 4/36 **Q06.** $\{ x : x = \frac{n}{n+1}$ where n is a natural number and $1 \le n \le 6 \}$

Q07. R – {1, 4}. **Q08.** $\frac{1 \pm i\sqrt{14}}{3}$

Q09. Limit doesn't exist as Left hand limit = – 4 and Right hand limit = 4.

Q10. The square root of every positive number is not positive.

Q12. **(i)** $A = \{a, b\}, B = \{1, 2, 5\}, A \times B = \{(a,1), (a,2), (a,5), (b,1), (b,2), (b,5)\}$ **(ii)** $\{7, 9, 11\}$

Q13. $3x - 4y = 25$ **Q14.** (–1,–14) **Q15.** $\frac{\sqrt{5}-1}{2}$

Q17. **OR** $\cos\theta = -\frac{3}{5}, \tan\theta = \frac{4}{3}, \operatorname{cosec}\theta = -\frac{5}{4}, \sec\theta = -\frac{5}{3}, \cot\theta = \frac{3}{4}$

Q18. ${}^{60}C_{20}, {}^{60}C_{30}\, x^{30}$ **Q19.** **(a)** 360 **(b)** 720 **(c)** 480 **(d)** 120 **Q21.** 9

Q22. Let the bisector of the angle $\angle BAC$ meets the side BC at point D. Then use, AB/ BC = BD/DC to find the ratio in which D divides BC. Hence find the coordinates of point D using section formulae.

Q23. –4/3 **OR** $-2\operatorname{cosec}\left(2x - \frac{\pi}{4}\right)\cot\left(2x - \frac{\pi}{4}\right)$ **Q24.** $[n - 4] : 5$

Q25. S = n A. **OR** n = ½ **Q26.** $\frac{x^2}{4} - \frac{y^2}{12} = 1$

Q27. $\sqrt{2}\left[\cos\frac{5\pi}{12} + i\sin\frac{5\pi}{12}\right]$ **OR** $\theta = n\pi + (-1)^n\frac{\pi}{3}, \theta = n\pi + (-1)^n\frac{4\pi}{3}$ where $n \in Z$.

Q29. **(i)** 99/249 **(ii)** 18/48.