

PLEASURE TEST REVISION SERIES XI

[2012-2013]

Subject - Mathematics
By OP Gupta [+91-9650 350 480]

Max.Time: 2 ½ Hrs.

Max.Marks: 100

SECTION – A

- Q01. Find the value of the trigonometric function: $\cot\left(-\frac{15\pi}{4}\right)$.
- Q02. A set is defined by $A = \{x : x = n + 1 \text{ where } n \leq 3, n \in \mathbb{N}\}$. Find A^2 .
- Q03. Find the coefficient of x^6y^3 in the expansion of $(x + 2y)^9$.
- Q04. Find n , if ${}^{n-1}P_3 : {}^{n-1}P_4 = 1 : 9$.
- Q05. Solve: $\frac{x}{4} < \frac{5x - 2}{3} - \frac{7x - 3}{5}$.
- Q06. Find the equation of the parabola with vertex at $(0, 0)$ and focus at $(0, 2)$.
- Q07. Express the complex number $z = (2 + i)/[(1 + i)(1 - i)]$ in $(x + iy)$ form.
- Q08. Find the 12th term of a G.P. whose 8th term is 192 and the common ratio is 2.
- Q09. If E and F are events such that $P(E) = \frac{1}{4}$, $P(F) = \frac{1}{2}$ and $P(E \text{ and } F) = \frac{1}{8}$, find $P(E \text{ or } F)$.
- Q10. Evaluate: $\lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$.

SECTION – B

- Q11. If $U = \{1, 2, \dots, 9\}$, $A = \{2, 4, 6, 8\}$ and $B = \{2, 3, 5, 7\}$. Verify that $(A \cup B)' = A' \cap B'$.
- Q12. The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?
- Q13. Using Binomial Theorem, prove that: $\sum_{r=0}^n 3^r \cdot {}^nC_r = 4^n$.
- Q14. If $\sin x = \frac{3}{5}$, $\cos y = -\frac{12}{13}$, where x and y both lie in II quadrant, find the value of $\sin(x + y)$.
- (OR) Prove that: $\frac{1 + \sin \theta - \cos \theta}{1 + \sin \theta + \cos \theta} = \tan\left(\frac{\theta}{2}\right)$.
- Q15. Prove the following by using the Principle of Mathematical Induction:
$$\frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots + \frac{1}{2^n} = 1 - \frac{1}{2^n} \quad \forall n \in \mathbb{N}$$
- Q16. Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are written as in a dictionary, what will be the 50th word?
(OR) Find the number of arrangements of the letters of the word INDEPENDENCE. In how many of these arrangements, (i) do the words start with P (ii) do the vowels never occur together and, (iii) do the words begin with I and end in P?
- Q17. Prove by PMI that “ $n(n+1)(n+5)$ is always a multiple of 3 for every natural number n ”.
(OR) In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that
(i) the student opted for NCC or NSS
(ii) the student has opted neither NCC nor NSS and,
(iii) the student has opted NSS but not NCC.
- Q18. Find the equation of the hyperbola with vertices at $(\pm 5, 0)$ and foci at $(\pm 7, 0)$.

- Q19. Find the equation of line making equal intercepts on the axes and making an angle 135° with X axis.
(OR) Find the coordinates of foci, vertices, length of major axis and eccentricity of $x^2/49 + y^2/36 = 1$.
- Q20. State the Converse and Contra positive of the following statements:
 (a) A quadrilateral is a parallelogram only if its opposite sides are equal.
 (b) A cadet joins NDA if he clear the SSB interview and Medical test.
- Q21. Find the coordinates of the point which divides the line segment joining the points $(-2, 3, 5)$ & $(1, -6, 6)$ in the ratio 2:3 externally.
- Q22. In a game, a fair die is thrown. Game is won if multiple of 3 appears. Otherwise the die is thrown again. Write the sample space.

SECTION – C

- Q23. Solve the following system of inequations graphically:
 $2x + y \leq 24$; $x + y \leq 11$; $2x + 5y \leq 40$; $x \geq 0$; $y \geq 0$.
- Q24. If the 21st & 22nd terms in the expansion of $(1+x)^{44}$ are equal, then find the value of x.
(OR) If a, b, c are in A.P.; b, c, d are in G.P. and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ are in A.P., prove that a, c, e are in G.P.
- Q25. (a) Find the distance of the line $4x + 7y + 5 = 0$ from the point $(1, 2)$ along the line $2x - y = 0$.
 (b) Find the image of the point $(3, 8)$ with respect to the line mirror $x + 3y = 7$.
- Q26. Calculate the mean deviation about mean for the following data:

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	6	7	15	16	4	2

- Q27. Compute the derivative of $\tan x$ using the first principle.
- Q28. Find the general solution of the equations:
 (a) $\sec^2 2x = 1 - \tan 2x$
 (b) $\sin x + \sin 3x + \sin 5x = 0$.
(OR) If $\tan x = 3/4$, where x is in III quadrant, find the value of $\sin(x/2)$, $\cos(x/2)$ and $\tan(x/2)$.
- Q29. (i) In a survey of 600 cadets in a school, 150 students were found to be interested in joining IAF and 125 interested in joining only IN. Find how many students were interested neither in IAF nor in IN.
 (ii) Show by Venn diagram that, $A - B = A \cap B'$.

#Prepared By: OP Gupta [Electronics & Communications Engineering, Indira Award Winner]

Contact on: +91-9650 350 480, +91-9718 240 480

Email id: theopgupta@gmail.com

Visit at: www.theopgupta.blogspot.com , www.theopgupta.wordpress.com

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