

LITTLE FLOWERS PUBLIC SR. SEC. SCHOOL
SUMMATIVE ASSESSMENT - II (MOCK TEST - I)

TIME : 3HRS.

CLASS – XI SUBJECT : MATHEMATICS

Max. Marks : 80

GENERAL INSTRUCTIONS :-

1. All questions are compulsory.
2. SECTION – A comprises of 6 questions of one marks each.
3. SECTION – B comprises of 11 questions of four marks each.
4. SECTION – C comprises of 5 questions of six marks each.

SECTION – A

- Q. 1. If $f(x) = (1 - x^3)^{1/3}$, find $f \circ f$
- Q. 2. Find the domain and range of the function $f(x) = \sqrt{9 - x^2}$
- Q. 3. If $\cos x = -\frac{5}{13}$, x lies in 3rd quadrant find the value of $\cot 2x$
- Q. 4. If length of perpendicular from origin on a line is 2 unit and the perpendicular is making an angle 135° with x - axis. Find equation of the line.
- Q. 5. State the octant in which the point $A(1, -2, +3)$ lies.
- Q. 6. Find $\frac{dy}{dx}$ if $y = \tan(x^\circ)$

SECTION – B

- Q. 7. There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1 , 50 to chemical C_2 , and 30 to both the chemicals C_1 and C_2 . Find the number of individuals exposed to
(i) Chemical C_2 but not chemical C_1 (ii) Neither Chemical C_1 nor chemical C_2 .
- Q. 8. In a triangle ABC prove that : $a(\cos C + \cos B) = 2(b - c) \cos^2\left(\frac{A}{2}\right)$
- Q. 9. Prove that : $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$
- OR**
- Prove that : $3(\sin x - \cos x)^4 + 4(\sin^6 x + \cos^6 x) + 6(\sin x + \cos x)^2 = 13$
- Q. 10. Using Principle of Mathematical Induction prove that :
- $$\text{for all } n \geq 1, \frac{1}{1.2.3} + \frac{1}{2.3.4} + \frac{1}{3.4.5} + \dots + \frac{1}{n(n+1)(n+2)} = \frac{n(n+3)}{4(n+1)(n+2)}$$
- Q. 11. What is the position of the word 'HEALTH' if letters of the given word are arranged as in dictionary?
- Q. 12. Find the total number of ways of drawing 2 balls of different colour from a bag containing 2 white, 3 red, 5 green, 4 black balls.

OR

- In how many ways can the letters of the word PERMUTATIONS be arranged if the
(i) no two vowels are together, (ii) there are always 4 letters between P and S?
- Q. 13. Find the equation of the ellipse, such that major axis is x - axis, centre is at origin and the ellipse passes through (4, 3) and (6, 2).
- Q. 14. Find the coordinates of the point where the line through (3, -4, -5) and (2, -3, 1) crosses the plane $2x + y + z = 7$.

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Q. 15. Assuming that straight lines work as the plane mirror for a point, find the image of the point (1, 2) in the line $x - 3y + 4 = 0$.

OR

If 'p' be the length of perpendicular drawn from origin on the line $\frac{x}{a} + \frac{y}{b} = 1$, such that a^2, p^2, b^2 are in A.P, prove that $a^4 + b^4 = 0$

Q. 16. If $\lim_{x \rightarrow 1} f(x) = f(1)$, for the function is $f(x) = \begin{cases} a + bx & ; x < 0 \\ 4 & ; x = 0 \\ b - ax & ; x > 0 \end{cases}$ find the value of a and b .

Q. 17. Out of 100 students, two sections of 40 and 60 are formed. If you and your friend are among 100 students. What is the probability that, (i) you both enter the same section?

(ii) you both enter the different section ?

OR

If A, B and C are any three events associated with any random experiment, then prove that, $P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(C \cap A) + P(A \cap B \cap C)$.

SECTION - C

Q. 18. A box contains 4 red, 5 white and 6 black balls. A person draws 5 balls from the box at random. Find the probability of selecting at least one ball of each colour.

Q. 19. Using first principle, find the differential coefficient of the function $f(x) = \tan \sqrt{x}$.

OR

Find the derivative of the following

(i) $\frac{x}{\sin^n x}$ (ii) $\frac{x^5 - \cos x}{\sin x}$

Q. 20. A line is such that its segment between the lines $5x - y + 4 = 0$ and $3x + 4y - 4 = 0$ is bisected at the point (1, 5). Obtain its equation.

Q. 21. Find the equation of the hyperbola having foci on $(0, \pm \sqrt{10})$ and which passes through (2, 3).

OR

Find the equation of the parabola with latus rectum joining the points (3, 6) and (3, -2).

Q. 22. Solve the system of inequalities graphically:

$$x + y \leq 4, x + 5y \geq 4, 3x + 2y > 6, x \leq 3, y \leq 3, x \geq 0, y \geq 0$$
