

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

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. Find the domain for which the functions $f(x) = 2x^2 - 1$ and $g(x) = 1 - 3x$ are equal.
- Q. 2. Let f and g be two functions given by $f = \{(2, 4), (5, 6), (8, -1), (10, -3)\}$
 $g = \{(2, 5), (7, 1), (8, 4), (10, 13), (11, -5)\}$ then find the range of $f.g$
- Q. 3. Find the value of $\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ$
- Q. 4. If foot of perpendicular from origin on a line is $(2, -3)$, find equation of the line.
- Q. 5. Find the length of perpendicular from the point $A(1, -4, -3)$ on x - axis.
- Q. 6. Find $\frac{dy}{dx}$ if $y = \frac{\sin x - \cos x}{\sin x + \cos x}$

SECTION – B

- Q. 7. 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 three men got medals in all the three sports, how many received medals in exactly two of the three sports ?
- Q. 8. In a triangle ABC prove that : $(b - c) \cot\left(\frac{A}{2}\right) + (c - a) \cot\left(\frac{B}{2}\right) + (a - b) \cot\left(\frac{C}{2}\right) = 0$

Q. 9. Prove that : $\sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 16\theta}}}} = 2 \cos \theta$

OR

Show that : $\frac{\sec 8x - 1}{\sec 4x - 1} = \frac{\tan 8x}{\tan 2x}$

- Q. 10. Using Principle of Mathematical Induction prove that for all $n \geq 1$,
 $n^3 + (n + 1)^3 + (n + 2)^3$ is divisible by 9.
- Q. 11. Find the number of words with or without meaning which can be made using all the letters of the word *EYGEPT*. If these words are written as in a dictionary, what will be the 50th word?
- Q. 12. A boy has 3 library tickets and 8 books of his interest in the library. Of these 8, he does not want to borrow Mathematics Part II, unless Mathematics Part I is also borrowed. In how many ways can he choose the three books to be borrowed?

OR

A student has to answer 10 questions, choosing atleast 4 from each of Parts A and B. If there are 6 questions in Part A and 7 in Part B, in how many ways can the student choose 10 questions?

- Q. 13. Find the vertex, focus, LLR and directrix of the parabola $4x^2 + 12x - 20y + 67 = 0$
- Q. 14. If $A(3, 2, 0)$, $B(5, 3, 2)$, $C(-9, 6, -3)$ are the vertices of a triangle Find the length AD, if AD bisects the angle $\angle BAC$.

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Q. 15. If the slope of a line passing through the point A(3, 2) is $\frac{3}{4}$, then find points on the line which are 5 units away from the point A.

OR

Two consecutive sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. If the equation of one diagonal is $11x + 7y = 9$, find the equation of the other diagonal.

Q. 16. If $\lim_{x \rightarrow \pi/2} f(x) = f\left(\frac{\pi}{2}\right)$, for the function is $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & x \neq \frac{\pi}{2} \\ k, & x = \frac{\pi}{2} \end{cases}$ find the value of k .

OR

If $y = \sqrt{\frac{1-x}{1+x}}$, prove that $(1-x^2) \frac{dy}{dx} + y = 0$

Q. 17. 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 has opted neither NCC nor NSS. (ii) The student has opted NCC but not NSS.

SECTION - C

Q. 18. If four 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 ?

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

Q. 20. Find the direction in which a line must be drawn through the point $(-1, 2)$ so that its point of intersection with the line $x + y = 4$ may be at a distance 3 units from this point.

OR

A ray of light is sent along the line $x - 2y = 3$. Upon reaching the line $3x - 2y = 5$, the ray is reflected from it. Find the equation of the line containing the reflected ray.

Q. 21. Find the equation of the hyperbola whose foci are $(8, 3)$, $(0, 3)$ and eccentricity $(e) = \frac{4}{3}$.

OR

Find the intercept on axes made by a circle having $(-4, 3)$ and $(12, -1)$ as ends of a diameter.

Q. 22. (i) A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 litres of the 8% solution, how many litres of the 2% solution will have to be added?

(ii) A plumber can be paid under two schemes given as;

Scheme - I : Rs 600 and Rs 50 per hour, *Scheme - II* : Rs 170 per hour. If the job takes n hours, for what values of n does the scheme I gives the plumber better wages ?
