ANDHRA EDUCATION SOCIETY SCHOOLS
NEW DELHI
SUMMATIVE ASSESSMENT-I (2015-16)
CLASS - XI
SUBJECT - MATHEMATICS

Time : 3:00 Hrs.   Max Marks : 100

General Instructions :   6x3=18M
1. All questions are compulsory.
2. Sec.-A Consists of 6 questions of 1 mark each.
3. Sec.-B Consists of 13 questions of 4 marks each.
4. Sec.-C Consists of 7 questions of 6 marks each.
5. Internal choices given in 4 questions of sec B and 2 questions of See C.

SECTION - A

Q1. In an experiment of rolling a die, let A be the set of prime numbers and B be the set of **odd numbers**. Write the set representing A∩B.

Q2. If U = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A={1,2,3,4}
B= {2, 4, 6, 8}. Find (A–B)'

Q3. Let A = {1, 2, 3, 4, 5} **Define a relation R from A to A by** R= {(x, y) : y=x+3} $x, y \in A$

Q4. What is the value of $2 \sin^2 \frac{3\pi}{4} + 2\cos^2 \frac{\pi}{4}$

Q5. If tanx = $-\frac{4}{3}$, x is in quadrant Ⅳ then evaluate $\sin \frac{x}{2}$.

Q6. Solve for x : $\frac{1}{2}\left(\frac{3x}{5} + 4\right) \geq \frac{1}{3}(x-6)$.

SECTION - B

Q7. Let x = {1, 2, 3, 4,-----10}, A= {1, 2, 3, 4, 5,},
B={1, 3, 5, 7, 9} and C= {2, 4, 8, 10,}. Verify the towowing.
(a) A∩ (B∪C) = (A∩B) ∪(A∩C)   (b) A–B = A∩B'
(c) (A∪B)' = A'∩B'.

$(A \cup B)' = A' \cap B'$

Q8. Let a relation be R={(χ, χ^3) : χ is a prime number less than 10}
(a) Write the relation R in roster from (b) Write the domain and range of R.

Q9. If $f(\chi) = \sqrt{\chi^2 - 1}$ and $g(n) = \sqrt{4 - x^2}$ Find Domain of $f(\chi)$, $g(\chi)$ and $f(\chi) + g(\chi)$.

OR

Find domain and range of $\sqrt{16 - x^2}$.

Q10. Prove by principle of Mathematical Induction $1\times3 + 3\times5 + 5\times7$

$$+ \text{-----} + (2n-1)(2n+1) = \frac{n\left(4n^2 + 6n - 1\right)}{3}.$$

OR

$$\frac{1}{3\times5} + \frac{1}{5\times7} + \frac{1}{7\times9} + \text{.......} + \frac{1}{(2n+1)(2n+3)} = \frac{n}{3(2n+3)}$$

Q11. Prove by using PMI :
$\chi^{2n} - y^{2n}$ is divisible by x+y.

Q12. Prove that $Cos6x = 32Cos^6x - 48Cos^4x + 18Cos^2\chi - 1$.

Q13. Solve and find general solution of $Sin\chi + Sin3\chi + Sin5\chi = 0$.

Q14. For any triangle ABC, Prove that

$$\frac{CosA}{a} + \frac{CosB}{b} + \frac{CosC}{c} = \frac{a^2 + b^2 + c^2}{2abc}.$$

OR

Find the value of $\tan\left(\frac{\chi+y}{2}\right)$ and $\cot\left(\frac{\chi-y}{2}\right)$ if $Sin\chi + Siny = a$ and $Cosx + Cosy = b$.

Q15. Solve the system of inequations graphically $2\chi + y \geq 4$, $\chi + y \leq 3$ and $2\chi - 3y \leq 6$.

Q16. The sum of n terms of two AP are in the ratio (7n+1) : (4n + 27). Find the ratio their 11th terms.

Q17. Find the sum to n terms of Series 6 + 66 + 666 + ...

OR

Find the three numbers in a GP whose sum is 19 and product is 216.

Q18. Evaluate $\displaystyle\lim_{x \to 0} \frac{e^{\sin x} - 1}{\log(1+x)}$.

Q19. If $y = \sqrt{x} + \dfrac{1}{\sqrt{x}}$ show that $\dfrac{2x\,dy}{dx} + y = 2\sqrt{x}$

$$2x\frac{dy}{dx} + y = 2\sqrt{x}$$

SECTION - C

Q20. In a survey of 100 persons it was found that 28 read magazine A, 30 read magazine B, 42 read magazine C, 8 read A and B, 10 read A and C, 5 read B and C, and 3 read all 3 magazines. Find how many read none of the three magazines and also find how many read magazine C only.

Q21. Prove that $\cos^2 x + \cos^2\left(x + \dfrac{\pi}{3}\right) + \cos^2\left(x - \dfrac{\pi}{3}\right) = \dfrac{3}{2}$.

OR

Find $\sin 18^\circ$ and $\cos 18^\circ$.

Q22. How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content.

Q23. If S_1, S_2, S_3 are the sum of first 'n' natural numbers, their squares and their Cubes, respectively. Show that

$$9S_2^2 = S_3\left(1 + 8S_1\right)$$

OR

It sum of an infinite Geometric series is 15 and the sum of the squares of these is 45. Find the series.

Q24. If $x = 1 + a + a^2 + \ldots\ldots\infty$ and $y = 1 + b + b^2 + \ldots\ldots\infty$ then Prove that

$$1 + ab + a^2b^2 + \ldots\ldots = \frac{xy}{x + y - 1}$$.

Q25. Find derivative of $x \sin x$ by first Principle.

Q26. Find derivative of
 (a) $f(x) = (x + \cos x)(x - \tan x)$
 (b) $f(x) = \dfrac{(4x + 5\sin x)}{(3x + 7\cos x)}$.