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CAMBRIDGE SCHOOL ,SRINIWASPURI

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Class: XI　　　　　**HALF YEARLY EXAMINATION - 2015**　　　　　M.M. 100

Time : 3 Hrs.　　　　　　　　　　　　　　　　　　　　　　Sub: maths

General instructions:

All questions are compulsory

Q.1 to Q.6 carries one mark each.

Q.7 to Q.19 carries four marks each

Q.20 & Q.26 carries six marks each

1. If $(x+1, y-2) = (3,1)$ then find x & y.

2. If $f(x) = x^2 + 7$ & $g(x) = 3x - 15$ then find $f(3) + g(-5)$.

3. Evaluate : $(1+i)^6 + (1-i)^6$.　　　　　　4. Find the modulus of $12i + 5$.

5. Find the H.C.F. of $4!$; $5!$; & $6!$.

6. Find the 13th term in $\left(9x - \frac{1}{3\sqrt{x}}\right)^{18}$;　　　x not equal to zero.

7. Two finite sets have 'm' & 'n' elements .if the total number of subsets of 1st is 56 more than the total number of subsets of the 2nd find 'm' & 'n' .

8. Prove using Venn-Diagram :　　$A \cap (A^I \cup B) = A \cap B$. **OR** $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

9. Find the domain & range of $f(x) = \sqrt{x-1}$

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OR

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Define $R = \{(x,y) : y = x+5 ; x \text{ is a natural number less than } 5\}$ depict R in rosterform & find its domain & range.

10. If $P = \{5,6\}$ & $Q = \{3,7,8\}$, then find $P \times Q$; $Q \times P$; $P \times P \times P$.

11. Find the conjugate of $\frac{(3-2i)(3i+2)}{(1+2i)(2-i)}$.

12. Solve : $2x^2 + ix\sqrt{15} - 1 = 0$.

13. Suppose most of your clothes are dirty & you are left with 2 pants & 3 shirts .How many choices do you have ?

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OR

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There are 6 flavours of ice cream, & 3 different cones .How many different single scoop ice creams can you order?

14. Find n when $P(n-1,3) : P(n,4) = 1 : 9$.

15. Solve & represent the solution on the number line : $5(2x-7) - 3(2x+3) \leq 0$ & $2x+9 \leq 6x+47$.

OR

$$\frac{3X-7}{2} \geq \frac{X+1}{4} \quad \& \quad 2X+9 \geq 6X+7$$

16. (a) Express $\sin 4x - \sin 2x$ as a product of trigonometric functions .

(b) Prove : $\dfrac{\sin(x+y)}{\sin(x-y)} = \dfrac{\tan x + \tan y}{\tan x - \tan y}$.

17. Prove : $\dfrac{\sec 8x - 1}{\sec 4x - 1} = \dfrac{\tan 8x}{\tan 2x}$.

18. Show that $\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$.

19. Find the term independent of x in $\left(\dfrac{3x^2}{2} - \dfrac{1}{3x}\right)^6$

20. Solve graphically : $x - 2y \leq 3$; $3x + 4y \geq 12$; $x \geq 0$; $y \geq 1$.

21. If the coefficients of 3 consecutive terms in the expansion of $(1+a)^n$ are in the ratio of $1 : 7 : 42$. Find 'n'.

OR

The 2nd , 3rd & 4th terms in the binomial expansion of $(x+a)^n$ are 240 , 720 , & 1080 . Find x, a, & n.

22. Solve : (i) $\cot^2 x + \csc x + 3 = 0$; (ii) $\cos x + \cos 3x + \cos 5x + \cos 7x = 0$.

23. If $\csc x = -13/12$ & x lies in the 3rd quadrant Then find $\tan x$, $\sec x$ & $\cos x$ .Also find $\tan 75^0$.

24. (i) How many chords can be drawn through 21 points on a circle.

(ii) If there are 20 persons in a party & if each of them shakes hand with one another , how many handshakes happen in the party.

25. In an examination , a paper consists of 12 questions divided into 2 parts each containing 5 & 7 respectively .A student is required to attempt 8 questions in all , selecting atleast 3 from each part .In how many ways can a student select the questions? .

26. In a group of 50 persons , 14 drink fruit juice but not cold drink ;30 drink fruit juice & each person likes atleast one of the 2 drinks .Find (a)how many drink both . (b) drink cold drink but not fruit juice .

OR

If A = {3,5,7,9,11} ; B ={7,9,11,13} ; C ={11,13,15} D ={15,17] find (i) A-B (ii) A∩C (iii) CUD (iv)A∩BUD.

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