[Model Test-16_Cl–XI (cbse)/ 19th Feb'14] MODEL TEST (Pre ANNUAL'14) [FM–100 /Time–180 min.]

General Instructions :

i) All questions are compulsory.
ii) Section A_ Q. 1 to Q. 6 _ 1 mark each.
iii) Section B _Q. 7 to Q. 19 _ 4 marks each.
iv) Section C _Q. 20 to Q. 26 _ 6 marks each.
v) There is no overall choice. However an internal choice has been provided in some questions.

Section-A (01 mark each)

1. Write the following set in the roaster form : $D = \{x : x^3 = x, \quad x \in R\}$
2. Write the amplitude of the complex number $(-i)$.
3. Write the negation of the following statement : 'Sum of 3 and 7 is 9'.
4. $f = \{(3, 7), (4, 9), (-13, 7), (3, 11)\}$ is a relation. If f a function? Give reasons for your answer.
5. Four books are drawn from a bag which contains 7 Math books and 3 Physics books. What is the probability that all will be Math book ?
6. Evaluate: $\lim\limits_{x\to 0} x\sin\left(\frac{1}{x}\right)$

Section-B (04 marks each)

7. If $f(x)=\begin{cases} x+2, & \text{when } x\le -1 \\ kx^3, & \text{when } x\le -1 \end{cases}$ and if $\lim\limits_{x\to -1} f(x)$ exists, then find the value of k

OR, Evaluate: $\lim\limits_{x\to 0} \frac{(a+h)^2\sin(a+h)-a^2\sin a}{h}$

8. Find the derivative of $\frac{\sin x - x.\cos x}{x.\sin x + \cos x}$ with respect to x.
9. Write the complex number $z=\frac{1-i}{\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}}$ in polar form.
10. The English alphabet has 5 vowels and 21 consonants. How many words with two different vowels and 2 different consonants can be formed from the alphabet?
11. The coefficients of the $(r-1)^{th}$, r^{th} and $(r+1)^{th}$ terms in the expansion of $(x+1)^n$ are in the ratio 1 : 3 : 5. Find n and r.
12. Draw graph of $f(x) = 2+|x-1|$. OR,Find the domain and range of $f(x)=\frac{x^2+10x+25}{x^2-8x+12}$, also find f(3).
13. Prove that $\frac{\cos B.\cos C}{bc}+\frac{\cos C.\cos A}{ca}+\frac{\cos A.\cos B}{ab}=\frac{\sin^2 A}{a^2}$. (notations have their usual meanings.)
14. The coordinates of two vertices of ΔABC are $(-2, 5, 7)$ and $(3, -2, 5)$. If the coordinates of its centroid are $(1, -1, 1)$, then find the coordinates of the third vertex.
15. The vertices of ΔABC are A(2, 1), B(–2, 3) and C(4, 5). Find the equation of the internal bisector of $\angle ABC$.
16. Find the equation of the circle which touches y-axis and whose centre is (3, 2). Hence find the length of the chord intercepted from the x-axis.
17. Find the equation of the parabola, whose coordinates of focus and vertex are (–6, –6) and (–2, 2) respectively.
18. The vertices of an ellipse are $(-1, 2)$ and $(9, 2)$; its eccentricity is $\frac{4}{5}$. Find its equation.

19. Find the centre, eccentricity , vertices & the equations of the directrices of the hyperbola $4x^2 - 9y^2 + 8x + 36y = 68$

Section-C (06 marks each)

20. Prove by the principle of mathematical induction, that, $n(n+1)(n+5)$ is a multiple of 3, $\forall\, n \in N$.
21. Find the sum to n terms of the series $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \cdots$
22. Solve for 'x', $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$
23. Identify the quantifiers and write the negation of the following statements
    i) There exists a number which is equal to its square.
    ii) For all even integers x, x^2 is also even.
    iii) There exists a number which is a multiple of 6 and 9.
24. Solve the following system of inequalities graphically : $x + 2y \leq 10$, $x + y \geq 1$, $x - y \leq 0$, $x \geq 0$, $y \geq 0$.
25. Two students Anil and Ashima appeared in an examination. The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the probability that,
    a) Both Anil and Ashima will not qualify the examination.
    b) At least one of them will not qualify the examination and
    c) Only one of them will qualify the examination.
26. The mean and variance of 7 observations are 8 and 16, respectively. If five of the observations are 2, 4, 10, 12 and 14. Find the remaining two observations.

"Success is never an Accident.
It is the result of Right Decision at the Right Time."

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