VGR COACHING CENTER

CLASS-X1 ***MATHS*** ***MARK-80***

PART-A

1. **If $|x + 2| \leq 9$, then x belongs to**
   (1)$(-\infty,-7)$ (2) $[-11, 7]$ (3) $(-\infty,-7) \cup [11,\infty)$ (4) $(-11, 7)$
2. **The solution of $5x - 1 < 24$ and $5x + 1 > -24$ is**
   (1) (4, 5) (2) (−5,−4) (3) (−5, 5) (4) (−5, 4)
3. **If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is**
   (1) 0.5 (2) 2.5 (3) 1.5 (4) 1.25
4. **If 3 is the logarithm of 343, then the base is**
   (1) 5 (2) 7 (3) 6 (4) 9
5. **The number of solutions of $x^2 + |x - 1| = 1$ is**
   (1) 1 (2) 0 (3) 2 (4) 3

PART-B ***[ANY 9]***

1. **Prove that $\sqrt{3}$ is an irrational number**
2. **Solve $|2x - 3| = |x - 5|$.**
3. **Our monthly electricity bill contains a basic charge, which does not change with number of units used, and a charge that depends only on how many units we use. Let us say Electricity Board charges Rs.110 as basic charge and charges Rs. 4 for each unit we use. If a person wants to keep his electricity bill below Rs.250, then what should be his electricity usage?**
4. **Find the number of solutions of $x^2 + |x - 1| = 1$**
5. **Solve the equation $\sqrt{6 - 4x - x^2} = x + 4$.**
6. **Find the real roots of $x^4 = 16$**
7. **Find the values of p for which the difference between the roots of the equation $X^4 + px + 8 = 0$ is 2.**
8. **Simplify and hence find the value of n: $3^{2n} 9^{2} 3^{-n} / 3^{3n} = 27$**
9. **Prove $\log a^2/bc + \log b^2/ca + \log c^2/ab = 0$**
10. **How many licence plates may be made using either two distinct letters followed by four digits or two digits followed by 4 distinct letters where all digits and letters are distinct**
11. **What is the unit digit of the sum 2! + 3! + 4! + ... + 22!?**

PART-C ***[ANY 9]***

1. **a. Evaluate $n! / r!(n - r)!$ when (i) $n = 7, r = 5$.**
   b. Find the value of n if (i) $(n + 1)! = 20(n - 1)!$
2. **How many 4 - digit even numbers can be formed using the digits 0, 1, 2, 3 and 4, if repetition of digits are not permitted?**
3. **If $x = \sqrt{2} + \sqrt{3}$ find $x^2 + 1 / x^2 - 2$**
4. **If $\log_2 x + \log_4 x + \log_{16} x = 7 / 2$ find the value of x.**
5. **Resolve into partial fractions: $x + 1 / x^2(x - 1)$**
6. **Find all values of x that satisfies the inequality $2x - 3 / (x - 2)(x - 4) < 0$.**
7. **If α and β are the roots of the quadratic equation $x^2 + \sqrt{2}x + 3 = 0$, form a quadratic polynomial with zeroes $1/\alpha, 1/\beta$.**
8. **A model rocket is launched from the ground. The height h reached by the rocket after t seconds from lift off is given by $h(t) = -5t^2 + 100t$, $0 \le t \le 20$. At what time the rocket is 495 feet above the ground?**
9. **Solve $1 / |2x - 1| < 6$ and express the solution using the interval notation**
10. **The equations $x^2 - 6x + a = 0$ and $x^2 - bx + 6 = 0$ have one root in common. The other root of the first and the second equations are integers in the ratio 4 : 3. Find the common root**

PART-D ***[ANY 5]***

1. **Resolve into partial fractions: $2x / (x^2 + 1)(x - 1)$**
2. **Resolve into partial fractions $X^2 + x + 1 / X^2 - 5x + 6$**
3. **Simplify $1/ 3 - \sqrt{8} - 1/\sqrt{8} - \sqrt{7} + 1/\sqrt{7} - \sqrt{6} - 1/\sqrt{6} - \sqrt{5} + 1/\sqrt{5} - 2$**
4. **Prove that $\log 2 + 16 \log 16/15 + 12 \log 25/24 + 7 \log 81/80 = 1$.**
5. **How many strings of length 6 can be formed using letters of the word FLOWER if**
   (i) either starts with F or ends with R?
   (ii) neither starts with F nor ends with R?
6. **Let $S = \{1, 2, 3\}$ and $\rho = \{(1, 1), (1, 2), (2, 2), (1, 3), (3, 1)\}$.**

(i) Is ρ reflexive? If not, state the reason and write the minimum set of ordered pairs to be included to ρ so as to make it reflexive

(ii) Is ρ symmetric? If not, state the reason, write minimum number of ordered pairs to be included to ρ so as to make it symmetric and write minimum number of ordered pairs to be deleted from ρ so as to make it symmetric.

(iii) Is ρ transitive? If not, state the reason, write minimum number of ordered pairs to be included to ρ so as to make it transitive and write minimum number of ordered pairs to be deleted from ρ so as to make it transitive.

(iii) Is ρ an equivalence relation? If not, write the minimum ordered pairs to be included to ρ so as to make it an equivalence relation.

PREPARED BY
G.RAJA M.E,.Ph.D
VGR COACHING CENTER
INJAMBAKKAM