

Time: 2 Hours

M. Marks: 30

1. If $x^{140} + 2x^{151} + k$ is divisible by $x + 1$, then the value of k is (1 marks)
 - (a) 1
 - (b) -3
 - (c) 2
 - (d) -2
2. If $x^{51} + 51$ is divided by $x + 1$, the remainder is (1 marks)
 - (a) 0
 - (b) 1
 - (c) 49
 - (d) 50
3. One factor of $x^4 + x^2 - 20$ is $x^2 + 5$. The other factor is (1 marks)
 - (a) $x^2 - 4$
 - (b) $x - 4$
 - (c) $x^2 - 5$
 - (d) $x + 4$
4. $(x + 1)$ is a factor of $x^n + 1$ only if (1 marks)
 - (a) n is an odd integer
 - (b) n is an even integer
 - (c) n is a negative integer
 - (d) n is a positive integer
5. The expression $x^4 + 4$ can be factorized as (1 marks)

(a) $(x^2+2x+2)(x^2-2x+2)$

(b) $(x^2+2x+2)(x^2+2x-2)$

(c) $(x^2-2x-2)(x^2-2x+2)$

(d) $(x^2+2)(x^2-2)$

6. If $3x = a + b + c$, then the value of $(x-a)^3 + (x-b)^3 + (x-c)^3 - 3(x-a)(x-b)(x-c)$, is (1 marks)

(a) $a + b + c$

(b) $(a-b)(b-c)(c-a)$

(c) 0

(d) None of these

7. If $a^{1/3} + b^{1/3} + c^{1/3} = 0$, then (1 marks)

(a) $a + b + c = 0$

(b) $(a + b + c)^3 = 27abc$

(c) $a + b + c = 3abc$

(d) $a^3 + b^3 + c^3 = 0$

8. Show that $(x-3)$ is a factor of the polynomial $x^3 - 3x^2 + 4x - 12$. (2 marks)

9. Evaluate: (2 marks)

(i) $\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$

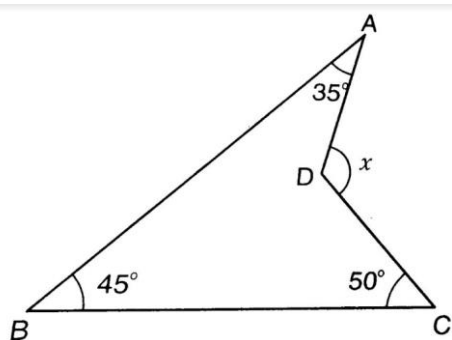
10. Factorize each of the following expressions: (2 marks)

(i) $a^7 + ab^6$

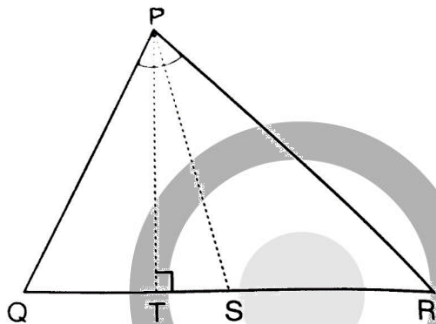
11. ABC is a triangle. The bisector of the exterior angle at B and the bisector of $\angle C$ intersect each other at D.

prove that $\angle D = \frac{1}{2} \angle A$. (3 marks)

12. In Fig. compute the value of x. (3 marks)



13. In Fig. PS is the bisector of $\angle QPR$ and $PT \perp QR$. Show that $\angle TPS = \frac{1}{2}(\angle Q - \angle R)$. (3 marks)



14. If $x^3 + ax^2 - bx + 10$ is divisible by $x^2 - 3x + 2$, find the value of a and b. (4 marks)
15. If $x + y + z = 1$, $xy + yz + zx = -1$ and $xyz = -1$, find the value of $x^3 + y^3 + z^3$. (4 marks)

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