DPP No. # A4 (JEE–ADVANCED)

Total Marks : 30		**Max. Time : 30 min.**
Comprehension ('–1' negative marking) Q.1 to Q.5	**(3 marks, 3 min.)**	**[15, 15]**
Single choice Objective ('–1' negative marking) Q.6 to Q.7	**(3 marks, 3 min.)**	**[06, 06]**
Subjective Questions ('–1' negative marking) Q.8 to Q.10	**(3 marks, 3 min.)**	**[09, 09]**

Question No.	1	2	3	4	5	6	7	8	9	10	Total
Marks Obtained											

Comprehension (Q. No. 1 to 5)

If a function f is defined by $f(x) = a_0 x^n + a_1 x^{n-1} + a_2 x^{n-2} + ... + a_{n-1} x + a_n$ where n is a non negative integer and $a_0, a_1, a_2, ..., a_n$ are real numbers and $a_0 \neq 0$, then f is called a polynomial function of degree n. For polynomials we can define the following theorem

(i) **Remainder theorem :** Let p(x) be any polynomial of degree greater than or equal to one and 'a' be any real number. If p(x) is divided by (x – a), then the remainder is equal to p(a).

(ii) **Factor theorem :** Let p(x) be a polynomial of degree greater than or equal to 1 and 'a' be a real number such that p(a) = 0, then (x – a) is a factor of p(x). Conversely, if (x – a) is a factor of p(x), then p(a) = 0.

1. The factor of the polynomial $x^3 + 3x^2 + 4x + 12$ is
(A) x + 3 (B) x – 3 (C) x + 2 (D) x – 2

2. The remainder when the polynomial $P(x) = x^4 – 3x^2 + 2x + 1$ is divided by x – 1 is
(A) 0 (B) 1 (C) 2 (D) 3

3. The polynomials $P(x) = kx^3 + 3x^2 – 3$ and $Q(x) = 2x^3 – 5x + k$, when divided by (x – 4) leave the same remainder. Then the value of k is
(A) 2 (B) 1 (C) 0 (D) –1

4. Let f(x) be a polynomial function. If f(x) is divided by x–1, x+1 & x+2, then remainders are 5, 3 and 2 respectively. When f(x) is divided by $x^3 + 2x^2 – x – 2$, then remainder is :
(A) x – 4 (B) x + 4 (C) x – 2 (D) x + 2

5. If (x – a) is a factor of $x^3 – a^2x + x + 2$, then 'a' is equal to
(A) 0 (B) 2 (C) –2 (D) 1

6. Let $N = (2 + 1)(2^2 + 1)(2^4 + 1) ..... (2^{32} + 1) + 1$ and $N = 2^\lambda$ then the value of λ is
(A) 63 (B) 64 (C) 65 (D) 66

7. If $(x + y)^2 = 2(x^2 + y^2)$ and $(x – y + \lambda)^2 = 4$, $\lambda > 0$, then λ is equal to :
(A) 1 (B) 2 (C) 3 (D) 4

8. Find the power set of the set {a, b, c}.

9. Let A = {1, 2, 3, 5}, B = {1, 2, 3} and C = {1, 2, 5}. Find all the sets X satisfying.
(i) $X \subset A, X \not\subset B$ (ii) $X \subset A, X \not\subset C$
(iii) $X \subset B, X \neq B, X \not\subset C$ (iv) $X \subset A, X \subset B, X \subset C$

10. Let A = {ϕ, {ϕ}, 2, {2, ϕ}, 3}, which of the following are true?
(i) $\phi \in A$ (ii) $\phi \subset A$ (iii) $\{\phi\} \in A$
(iv) $\{\phi\} \subset A$ (v) $2 \subset A$ (vi) $\{2, \phi\} \subset A$
(vii) $\{\{2\}, \{3\}\} \subset A$ (viii) $\{2, 3\} \not\subset A$ (ix) $\{\phi, 2, 3\} \subset A$.

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1. (A) **2.** (B) **3.** (B) **4.** (B) **5.** (C) **6.** (B) **7.** (B)

8. $2^3 = 8$ elements अवयव { ϕ, {a}, {b} , {c} , {a, b} , {b, c} , {c, a}, {a, b, c}}

9. **(i)** {5}, {5, 1}, {5, 2}, {5, 3}, {5, 1,2}, {5,1,3}, {5,2,3}, {1, 2, 3, 5}

(ii) {3}, {3, 1}, {3, 2}, {3,5}, {3,1,2}, {3,1,5}, {3,2,5}, {1, 2, 3, 5}

(iii) {3}, {3, 1}, {3, 2} **(iv)** {1}, {2}, {1,2}, ϕ

10. **(i)** T **(ii)** T **(iii)** T **(iv)** T **(v)** F **(vi)** T

(vii) F **(viii)** F **(ix)** T