

Model Question Paper

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B.Sc (Hons) Semester - V

Subject - Mathematics

Paper - DSE MATH 502 A

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Group - A (2x10=20)

Each part of question carries 2 Marks

1. Choose the correct Answer

(a) If $|A| = \alpha_1$ and $|B| = \alpha_2$ then $|A \cup B|$ is

(i) α_1 (ii) α_2 (iii) $\alpha_1 + \alpha_2$ (iv) $\alpha_1 - \alpha_2$

(b) The set R of all real numbers in the interval $[0, 1]$ is

(i) Countable (ii) Uncountable (iii) denumerable
(iv) All of these

(c) Let if $A = \{1, 2, 3\}$ and $R = \{(1, 2), (2, 1), (1, 1)$

$(2, 2)\}$; the R is

(i) Transitive (ii) Reflexive (iii) A relation in A
(iv) Not a relation in A .

(d) If $f: X \rightarrow Y$; $A \subseteq X$, $B \subseteq X$, then

(i) $f(A \cup B) = f(A) \cup f(B)$ (ii) $f(A \cup B) \neq f(A) \cup f(B)$

(iii) $f(A \cup B) = f(A) \cap f(B)$ (iv) $f(A \cap B) = f(A) \cup f(B)$

(e) Every totally ordered set is - - - ordered.

(f) The equation $x^{10} - x^4 + x^3 - x^2 + 1 = 0$ has at least

(i) 8 complex roots (ii) 6 complex roots.

(iii) 2 complex roots (iv) 4 complex roots.

⑧ If the cubic $a_0x^3 + 3a_1x^2 + 3a_2x + a_3 = 0$ has all real roots then

- (i) $G^2 + 4H^3 > 0$ (ii) $G^2 + 4H^3 < 0$
(iii) $G^2 + 4H^3 = 0$ (iv) $G = 0, H = 0$

⑨ If α, β, γ be the roots of $x^3 + px^2 + qx + r = 0$ then the value of $\sum \alpha^2 \beta$ is

- (i) p^2q (ii) $3p^2 + 2r$ (iii) $3r - pq$ (iv) $p^4 - 2q^2 - r$

⑩ If α, β, γ be the roots $ax^3 + bx^2 + cx + d = 0$ then $\sum \alpha \beta$ is

- (i) b/d (ii) d/a (iii) $-b/a$ (iv) c/a

⑪ A polynomial equation of degree five has at least - - - real roots.

Group - B

(5x4=20)

Answer any four questions

Each question carries 5 marks.

- If $\{A_i : i \in I\}$ be an index family of subsets of universal set Ω and $B \subseteq \Omega$ then prove that
(i) $B \cup (\bigcap_i A_i) = \bigcap_i (B \cup A_i)$
(ii) $B \cap (\bigcup_i A_i) = \bigcup_i (B \cap A_i)$
- Define partial ordered set and totally ordered set.
- Prove that set of real number is uncountable.
- Define partition of set. Also define maximal and minimal elements.
- Prove that the equation $x^5 - x + 16 = 0$ has two pairs of imaginary roots.

7. Solve the equation whose roots are in H.P. $6x^3 - 11x^2 - 3x + 2 = 0$.
8. If $\alpha, \beta, \gamma, \delta$ be the roots of biquadratic equation $x^4 + Px^3 + Qx^2 + Rx + S = 0$ find in terms of the co-efficients the value of the symmetric functions
 (i) $\sum \alpha^2 \beta$ (ii) $\sum \alpha^2 \beta \gamma$.
9. Solve the equation by Cardon's Method
 $x^3 - 30x - 133 = 0$.

Group - C

15x2=30

Answer any two question

Each question carries 15 marks.

10. (a) Define lattice and Complete lattice. Give an example of partial ordered set which is not lattice.
- (b) Let P be the relation on the set R of real numbers given by aPb iff $|a-b| \leq 1/2$. Prove that P is not equivalence relation.
11. State and prove fundamental theorem on equivalence relation.
12. (a) Establish the relation between roots and the co-efficients.
- (b) Solve the equation
 $x^4 + 20x^3 + 143x^2 + 430x + 462 = 0$
 by removing 2nd term.

(4)

13. To reduce the equation $a_0x^4 + 4a_1x^3 + 6a_2x^2 + 4a_3x + a_4 = 0$ in the form $z^4 + 6Hz^2 + 4Gz + (a_0^2I - 3H^2) = 0$ (in which 2nd term is absent).

X

Answers of objective

- (a) - (iii)
- (b) - (ii)
- (c) - (i)
- (d) - (i)
- (e) - partially
- (f) - (iv)
- (g) - (ii)
- (h) - (iii)
- (i) - (iv)
- (j) - One