

MODEL TEST PAPER-- 1

Roll No:

Hi-Tech Institute of Engineering & Technology

DEPARTMENT OF BCA

Course- BCA

(SEM - 2) EVEN SEMESTER MODEL TEST PAPER 1

SUBJECT - Mathematics

Subject Code: BCA-201

TIME: 3 hrs

Maximum Marks:75

Note: Attempt all the sections as per instructions.

SECTION A

Note: Attempt all questions. 3*5=15

1. Define symmetric and Anti symmetric relation.
2. If A and B are two sets such that $n(A)=27$, $n(B)=35$ and $n(A \cup B)=50$. Find $n(A \cap B)$.
3. If $A = \{1,2,3,4\}$, $B = \{2,4,6\}$, $C = \{1,2,5\}$. Compute $(A-B) \times (B-C)$.
4. Show that the set of all factors of 12 under divisibility forms a lattice.
5. Show that the planes $3x-2y+z=0$ and $4x+3y-6z-25=0$ are at right angle.

SECTION B

Note: Attempt any two questions.

7.5*2=15

6. Evaluate $\int_0^3 \int_1^2 xy(1+x+y) dx dy$

7.

Find the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$.

8. Define composition function. Let $f: N \rightarrow R$ s.t $f(x)=2x-3$ and $g: Z \rightarrow R$ s.t. $g(x)= (x-3)/2$, then find formula for $g \circ f: N \rightarrow R$.

SECTION C

Note: Attempt any three questions.

15*3=45

9. (i) Change the order of integration

$$\int_0^a \int_x^{a^2} \varphi(x, y) dx dy.$$

(ii) Evaluate the double integral

$$\int_{-a}^a \int_{-b\sqrt{a^2-x^2}}^{b\sqrt{a^2-x^2}} (x+y)^2 dx dy$$

10. Use Distributive laws to prove the following:

(i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

(ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

11. Find the equation of the plane passing through the four points (0,-1,-1), (4,5,1), (3,9,4) and (-4,4,4).

12.(i) Discuss the maxima or minima of the function

$$u = xy + \left(\frac{a^3}{x}\right) + \left(\frac{a^3}{y}\right)$$

(ii) Show that $\sin x(1 + \cos x)$ is a maximum at $x = \pi/3$

13. Let $N = \{1, 2, 3, 4, \dots\}$ and a relation is defined in $N \times N$ as follows (a,b) is related to (c,d) iff $ad = bc$, then show whether R is an equivalence relation or not.