Brain International School

Vikas Puri, New Delhi

ASSIGNMENT NO. 2

SUBJECT: MATHEMATICS CLASS-XII MAY,2025

CHAPTER : RELATION AND FUNCTIONS

Q1 Let f: R → R be the function defined by f(x) = $\frac{1}{2-cosx}$ $\forall\, x \in R$ .Then, find range of f.

Q 2 Find the maximum number of equivalence relations on the set A = {1, 2, 3}.

Q3 Prove that relation R on Z defined by $(a, b) \in R \Leftrightarrow a - b$ is divisible by 5 is an equivalence relation on Z.

Q4 Let a relation R on R be defined as R = $\{(a, b) : 1 + ab > 0; a, b \in R\}$. Show that R is reflexive, symmetric , transitive.

Q5 Let R be the relation on N x N defined by, $(a, b)R(\, c, d) \Leftrightarrow ad(c + b) = bc(a + d)$.SHOW EQ

Q 6 If A = {1, 5, 6}, B = {7, 9} and R = {(a, b) ∈ A ×B : |a – b| is even}. Then write the relation R. **Q 22** R = {(1, 7), (1. 9), (5, 7), (5, 9)}

Q 7 In the set A = {1, 2, 3, 4, 5}, a relation R is defined by R = {(x, y) : x, y ∈ A and x < y}. Then R is
(a) Reflexive (b) Symmetric (c) Transitive (d) None

Q 8Let A = {1, 2, 3, 4} and R = {(1, 1), (2, 2), (3, 3), (4, 4), (1, 2), (2, 1)} be defined on set A. Then the equivalence classes of [1] is
(a) (1, 2) (b) [1, 2] (c) {1, 2} (d) None

Q 9 Let A = {1, 2}. Then number of reflexive relations defined on A is
(a) 4 (b) 8 (c) 16 (d) 0

Q 10 Let A = {1, 2, 3}. Then number of symmetric relations defined on A is
(a) 8 (b) 64 (c) 1 (d) 0

Q 11 Let A = {1. 2}. Then number of reflexive and symmetric relations defined on A is
(a) 8 (b) 4 (c) 2 (d) 1

Q 12 Let R be a relation on the set N of natural numbers defined by nRm if n divides m. Then R is
(a) Reflexive and symmetric (b) Transitive and symmetric
(c) Equivalence (d) Reflexive, transitive but not symmetric

Q 13 Let L denote the set of all straight lines in a plane. Let a relation R be defined by l R m if and only if l is perpendicular to m $\forall l$, m ∈ L. Then R is
(a) Reflexive (b) Symmetric (c) Transitive (d) None

Q 14 Which of the following is the principal value of $cosec^{-1}x$?

a) $\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$ b) $[0,\pi]-\frac{\pi}{2}$ c) $\left\{\frac{\pi}{2}\right\}\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$ d) $\left[-\frac{\pi}{2},\frac{\pi}{2}\right]-\{0\}$

Q 15 The domain of $sin^{-1}2x$ is

a) $[0,1]$ b) $[-1,1]$ c) $\left[-\frac{1}{2},\frac{1}{2}\right]$ d) $[-2,2]$

Q 16 The domain of the function $cos^{-1}(2x-1)$ is

a) $[0,1]$ b) $[-1,1]$ c) $(-1,1)$ d) $[0,\pi]$

Q 17 If $sin^{-1}x=y$, then

a) $0\le y\le\pi$ b) $-\frac{\pi}{2}<y<\frac{\pi}{2}$ c) $0<y<\pi$ d) $-\frac{\pi}{2}\le y\le\frac{\pi}{2}$

Q 18 The domain of the function defined by $f(x)=sin^{-1}\sqrt{x-1}$ is

a) $[1,2]$ b) $[-1,1]$ c) $[0,1]$ d) None of these

Q 19 The principal value of the expression $cos^{-1}[\cos(-680°))]$ is

a) $\frac{2\pi}{9}$ b) $\frac{-2\pi}{9}$ c) $\frac{34\pi}{9}$ d) $\frac{\pi}{9}$

Q20 The principal value of $sin^{-1}\left(\frac{-\sqrt{3}}{2}\right)$ is

a) $-\frac{2\pi}{3}$ b) $-\frac{\pi}{3}$ c) $\frac{4\pi}{3}$ d) $\frac{5\pi}{3}$

Q 21 Let $\theta=sin^{-1}(\sin(-600°)$, then value of θ is

a) $\frac{\pi}{3}$ b) $\frac{\pi}{2}$ c) $\frac{2\pi}{3}$ d) $\frac{-2\pi}{3}$

Q22 The value of $\cot(sin^{-1}x)$ is

a) $\frac{\sqrt{1+x^2}}{x}$ b) $\frac{x}{\sqrt{1+x^2}}$ c) $\frac{1}{x}$ d) $\frac{\sqrt{1-x^2}}{x}$

Q 23 If $tan^{-1}x=\frac{\pi}{10}$ for some $x\in\boldsymbol{R}$, then the value of $cot^{-1}x$ is

a) $\frac{\pi}{5}$ b) $\frac{2\pi}{5}$ c) $\frac{3\pi}{5}$ d) $\frac{4\pi}{5}$

Q 24 The value of $\sin\left(2\,sin^{-1}(.6)\right)$ is

a) .48 b) .96 c) 1.2 d) 1.48

Q 25 If $sin^{-1}x+sin^{-1}y=\frac{\pi}{2}$, then value of $cos^{-1}x+cos^{-1}y$ is

a) $\frac{\pi}{2}$ b) π c) 0 d) $\frac{2\pi}{3}$

Q 26 The value of the expression $\sin[cot^{-1}(\cos(tan^{-1}1))]$ is

0 b) 1 c) $\frac{1}{\sqrt{3}}$ d) $\sqrt{\frac{2}{3}}$