FUNCTIONS – II

Class: IX : Mathematics

IIT FOUNDATION

TEACHING TASK

01. $f(x) = \dfrac{x}{e^x - 1} + \dfrac{x}{2} + 1$

$f(-x) = \dfrac{-x}{e^{-x} - 1} - \dfrac{x}{2} + 1$

$= \dfrac{-xe^x}{1 - e^x} - \dfrac{x}{2} + 1$

$= \dfrac{-x e^x + x - x}{1 - e^x} - \dfrac{x}{2} + 1$

$= \dfrac{x(1 - e^x) - x}{1 - e^x} - \dfrac{x}{2} + 1$

$= x - \dfrac{x}{1 - e^x} - \dfrac{x}{2} + 1$

$= \dfrac{x}{e^x - 1} + \dfrac{x}{2} + 1 = f(x)$

Hence, $f(x)$ is even function.

Ans: B

02. $y = \left[4 - (x-7)^3\right]^{1/5}$

$\Rightarrow y^5 = 4 - (x-7)^3$

$\Rightarrow (x-7)^3 = 4 - y^5$

$\Rightarrow x - 7 = (4 - y^5)^{1/3}$

$x = 7 + (4 - y^5)^{1/3}$

$f^{-1}(x) = 7 + (4 - x^5)^{1/3}$

Ans: A

03 Let $y = \frac{e^x + e^{-x}}{2}$

Let $e^x = a$

$\Rightarrow y = \frac{a + a^{-1}}{2}$

$\Rightarrow 2y = \frac{a^2 + 1}{a}$

$\Rightarrow 2ya = a^2 + 1$

$\Rightarrow a^2 - 2ya + 1 = 0$

$\Rightarrow a = \frac{2y + \sqrt{4y^2 - 4}}{2}$

$\Rightarrow a = y + \sqrt{y^2 - 1}$

$\Rightarrow e^x = y + \sqrt{y^2 - 1}$

$\Rightarrow x = \log\left(y + \sqrt{y^2 - 1}\right)$

$\Rightarrow f^{-1}(x) = \log_e\left(x + \sqrt{x^2 - 1}\right)$ Ans: c

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04. $y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

Let $e^x = a$

$\Rightarrow y = \frac{a - a^{-1}}{a + a^{-1}}$

$\Rightarrow y = \frac{a^2 - 1}{a^2 + 1}$

$\Rightarrow a^2 y + y = a^2 - 1$

$\Rightarrow y + 1 = a^2 - a^2 y$

$\Rightarrow y + 1 = a^2(1 - y)$

$\Rightarrow a^2 = \frac{1 + y}{1 - y}$

$a = \sqrt{\frac{1 + y}{1 - y}}$

$\Rightarrow$

③

04

$y = \dfrac{e^{x} - e^{-x}}{e^{x} + e^{-x}}$

let $e^{x} = a$

$\therefore\ y = \dfrac{a - a^{-1}}{a + a^{-1}}$

$\Rightarrow y = \dfrac{a^2 - 1}{a^2 + 1}$

$\Rightarrow y a^2 + y = a^2 - 1$

$\Rightarrow y + 1 = a^2 - y a^2$

$\Rightarrow y + 1 = a^2(1 - y)$

$\Rightarrow a^2 = \dfrac{1+y}{1-y}$

$\Rightarrow a = \sqrt{\dfrac{1+y}{1-y}}$

$\Rightarrow e^{x} = \sqrt{\dfrac{1+y}{1-y}}$

$\Rightarrow x = \log\left(\sqrt{\dfrac{1+y}{1-y}}\right)$

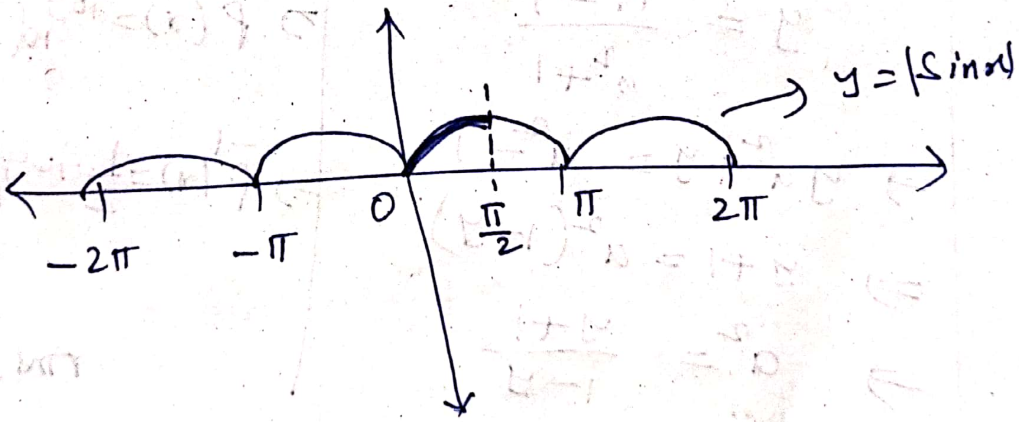
$\Rightarrow f^{-1}(x) = \log_e\left(\sqrt{\dfrac{1+x}{1-x}}\right)$

$= \dfrac{1}{2}\log\left(\dfrac{1+x}{1-x}\right)$

~~Ans. A~~

Ans: A

05 $f(x) = |\sin x|$



f is bijection in $[0, \frac{\pi}{2}]$

Ans: B

06

$y = 2^{x(x-1)}$

$\Rightarrow \log y = x(x-1)\log 2$

$\Rightarrow \log_2 y = x^2 - x$

$\Rightarrow x^2 - x - \log_2 y = 0$

$x = \dfrac{1 + \sqrt{1 + 4\log_2 y}}{2}$

$f^{-1}(x) = \dfrac{1 + \sqrt{1 + 4\log_2 x}}{2}$

Ans: B

4

07 $f(x) = (a - x^n)^{1/n}$

$fof(x) = f(f(x))$

$= \left[a - \left[\left(a - x^n\right)^{\frac{1}{n}}\right]^n\right]^{\frac{1}{n}}$

$= x$

Ans: A

08. Let $y = \dfrac{10^x - 10^{-x}}{10^x + 10^{-x}}$

Let $10^x = a$

$\Rightarrow x = \log_{10} a$

$\therefore y = \dfrac{a - a^{-1}}{a + a^{-1}}$

$y = \dfrac{a^2 - 1}{a^2 + 1}$

$\Rightarrow ya^2 + y = a^2 - 1$

$\Rightarrow y + 1 = a^2(1 - y)$

$\Rightarrow a^2 = \dfrac{y+1}{1-y}$

$\Rightarrow a = \sqrt{\dfrac{1+y}{1-y}}$

$\Rightarrow 10^x = \sqrt{\dfrac{1+y}{1-y}}$

$\Rightarrow x = \log_{10}\left(\sqrt{\dfrac{1+y}{1-y}}\right)$

$\Rightarrow f^{-1}(x) = \log_{10}\left(\sqrt{\dfrac{1+x}{1-x}}\right)$

$\Rightarrow f^{-1}(x) = \dfrac{1}{2} \log_{10}\left(\dfrac{1+x}{1-x}\right)$

Ans: B

09. $f(x) = [x]$, $g(x) = x - [x]$

$= \{x\}$ fractional part lies b/w 0 to 1.

$fog(x) = f(g(x))$

$= f(\{x\})$

$= [\{x\}] = 0$

Ans: D

10 $f(x) = \sin^2 x + \sin^2\left(x+\frac{\pi}{3}\right) + \cos x \cdot \cos\left(x+\frac{\pi}{3}\right)$

5

$= \sin^2 x + \left[\sin x \cdot \frac{1}{2} + \frac{\sqrt{3}}{2} \cdot \cos x\right]^2 +$

$\cos x \left[\cos x \cdot \frac{1}{2} - \sin x \cdot \frac{\sqrt{3}}{2}\right]$

$= \sin^2 x + \frac{1}{4}\left(\sin x + \sqrt{3}\cos x\right)^2 +$

$\frac{\cos x}{2}\left(\cos x - \sqrt{3}\sin x\right)$

$= \frac{5}{4}\left(\sin^2 x + \cos^2 x\right) = \frac{5}{4}.$

Now $g(f(x)) = g\left(\frac{5}{4}\right)$

$= 1$

Ans: A

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11 $f(x) = \sqrt{3}\sin x - \cos x + 2$

$= 2\left(\frac{\sqrt{3}}{2}\sin x - \frac{1}{2}\cos x\right) + 2$

$= 2\sin\left(x - \frac{\pi}{6}\right) + 2$

$\therefore 2\sin\left(x-\frac{\pi}{6}\right) + 2 = y$

$\Rightarrow x = \sin^{-1}\left(\frac{y-2}{2}\right) + \frac{\pi}{6}$

$\therefore f^{-1}(x) = \sin^{-1}\left(\frac{x-2}{2}\right) + \frac{\pi}{6}$

$= \frac{\pi}{2} - \cos^{-1}\left(\frac{x-2}{2}\right) + \frac{\pi}{6}$

$= \frac{2\pi}{3} - \cos^{-1}\left(\frac{x-2}{2}\right)$

Ans: B, C

12 $f(x) = \dfrac{ax+2}{x-b}$ (6)

$\Rightarrow \dfrac{ax+2}{x-b} = y$

$\Rightarrow x = \dfrac{2+by}{y-a}$

$\Rightarrow f^{-1}(x) = \dfrac{2+bx}{x-a}$

$f^{-1}(1) = \dfrac{2+b}{1-a} = 0 \Rightarrow b = -2$

f^{-1} is not defined at 3

$\therefore \dfrac{2+b.3}{3-a}$ ~~as~~ not defined.

when $3-a=0 \Rightarrow a=3$

Ans: A, D

13 Statement I: e^x and $\log_e x$ both are inverse functions to each other. (True)

Statement II: Conceptual. True

A

14. Statement I:

$$y=(x+1)^2-1$$

$$\Rightarrow (x+1)^2 = 1+y$$

$$\Rightarrow x=\sqrt{1+y}-1$$

$$\therefore f^{-1}(x)=\sqrt{1+x}-1$$

Now $f(x)=f^{-1}(x)$

$$\Rightarrow (x+1)^2-1=\sqrt{1+x}-1$$

$$\Rightarrow (x+1)^2=\sqrt{1+x}$$

$$\Rightarrow (x+1)^4-(1+x)=0$$

$$\Rightarrow (x+1)\left[(x+1)^3-1\right]=0$$

$$\Rightarrow x+1=0 \quad \text{or} \quad (x+1)^3=1$$

$$\Rightarrow x=-1 \quad \text{or} \quad x=0$$

Given $\{0,1\}$

hence statement I is false

Statement II: $y=(x+1)^2-1$

This graph is clearly a parabola.

Hence it is bijective

Ans: D.

15. let $F = f_6$

$$f_1 \circ F = f_1(F)$$
$$= f_1(f_6) = f_1\left(\frac{x}{x-1}\right)$$
$$= \frac{x}{x-1}$$

Ans: D

16. let $G = f_5$

$$G \circ f_3 = f_5 \circ f_3 = f_5(f_3)$$
$$= f_5(1-x)$$
$$= \frac{(1-x)-1}{1-x}$$
$$= \frac{x}{x-1} = f_6$$

Ans: A

17. let $H = f_2$

$$f_4 \circ H = f_4 \circ f_2$$
$$= f_4(f_2)$$
$$= f_4\left(\frac{1}{x}\right)$$
$$= \frac{1}{1-\frac{1}{x}}$$
$$= \frac{x}{x-1} = f_4$$

Ans: A

18 $f(x) = \dfrac{x-a}{x-b}$

9

let $a = 1, \quad b = 2$

$$f(x) = \frac{x-1}{x-2}$$

Now $f(x_1) = f(x_2)$

$$\Rightarrow \frac{x_1-1}{x_1-2} = \frac{x_2-1}{x_2-2}$$

$$\Rightarrow x_1x_2 - 2x_1 - x_2 + 2 = x_1x_2 - x_1 - 2x_2 + 2$$

$$\Rightarrow \quad x_1 = x_2$$

hence f is one-one function.

let $y = \dfrac{x-1}{x-2}$

$$\Rightarrow \quad x = \frac{2y-1}{y-1}$$

This is defined only when $y \neq 1$

If $y = 1 \Rightarrow 1 = \dfrac{x-1}{x-2}$

$\Rightarrow x-2 = x-1$ (Contradiction)

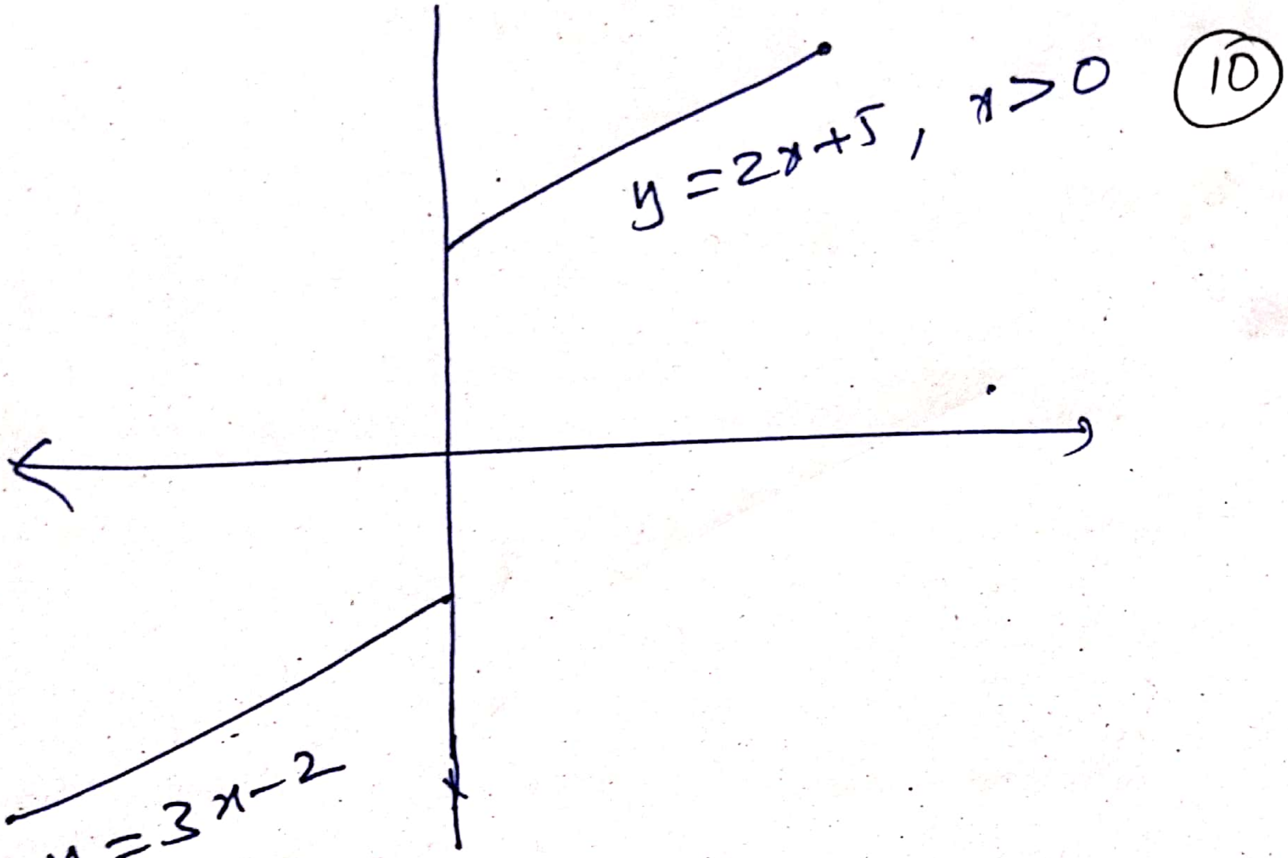
i.e. for $y = 1$, there is no pre-image.

hence it is not on-to function.

Ans. A

19.

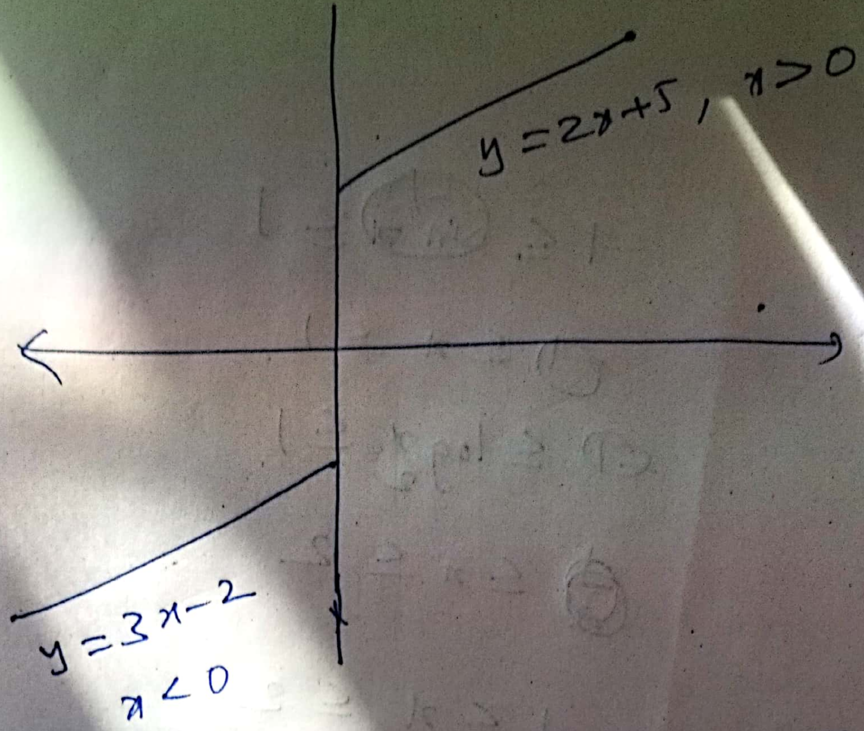
(10)



clearly f is one-one & on-to

Ans: C

19.



Clearly f is one-one & on-to

Ans: C

20. Let $f(x) = ax+b$, where $a \neq 0$

Given $f(f(x)) = x + f(x)$

$$f(ax+b) = x + ax+b$$

$$\Rightarrow a(ax+b) + \cancel{b} = x + ax + \cancel{b}$$

$$\Rightarrow a^2x + ab = x + ax$$

Coeff. of $x^2 \Rightarrow a^2 = 1+a$

$$\Rightarrow a^2 - a - 1 = 0$$

$$\Rightarrow a = \frac{1 \pm \sqrt{5}}{2}$$

$ab = 0$

$a \neq 0$, $b = 0$

Thus $f(x) = \left(\frac{1 \pm \sqrt{5}}{2}\right)x + 0$

Hence, there are two Linear functions.

Ans: 2

21. $f \circ f(1) = f(f(1))$ 11

$= f(1)$ since $1 \in Q$

$= 1$ since $1 \in Q$

Ans: 1

22 a) $f(x) = \sqrt{\sin^{-1}(\log_2 x)}$

$\Rightarrow 0 \leq \log_2 x \leq 1$

$\Rightarrow 1 \leq x \leq 2$

Domain = $[1, 2]$

b) $g(x) = \sqrt{\cos(\sin x)}$

Domain = R.

c) $h(x) = \sin^{-1}\left(\frac{1+x^2}{2x}\right)$

$\Rightarrow -1 \leq \frac{1+x^2}{2x} \leq 1$

$\Rightarrow \left|\frac{1+x^2}{2x}\right| \leq 1$

$\Rightarrow |1+x^2| \leq |2x|$ since $1+x^2 > 0$

$1+x^2 \leq |2x|$

$\Rightarrow x^2 - 2|x| + 1 \leq 0$

$\Rightarrow |x|^2 - 2|x| + 1 \leq 0$

$\Rightarrow (|x|-1)^2 \leq 0$

$\Rightarrow$ But $(|x|-1)^2$ is always either positive or Zero. $(|x|-1)^2 = 0$ or $|x| = 1 \Rightarrow x = \pm 1$

Domain = $\{-1, 1\}$

22 d) $f(x) = g(x) + h(x)$ (12)

$$= \underbrace{\sqrt{\cos(\sin x)}}_{R} + \underbrace{\sin^{-1}\left(\frac{1+x^2}{2x}\right)}_{\{-1,1\}}$$

hence Domain $= \{-1,1\}$

Ans: s, t, p, p

23 a) $f(x) = ax+b$

both injection and surjection.

b) $f(x) = [x]$

It is not Injective but it is surjective.

because $[1.35]=1$ & $[1.78]=1$

i.e. for both 1.35, 1.78 it gives the same image

c) $f(x) = |x|$

it is not Injective, but it is surjective

d) $f(x) = x^3$

Both injective and surjective.

Ans: r, q, q, r

LEARNERS TASK

(13)

CUQ's

1.	$(f^{-1})^{-1} = f$	Ans: A
2	$x-1=y$ $\Rightarrow x = 1+y$ $\Rightarrow f^{-1}(x) = 1+x$	Ans: B
3	Range of $\sin^{-1}(x) = [-\frac{\pi}{2} \le x \le \frac{\pi}{2}]$	Ans: A
4.	$(gof)^{-1} = f^{-1}og^{-1}$	Ans: C
5	$(gof)(x) = g(f(x))$	Ans: C
6	$f^{-1}(b) = \{a, \frac{a}{2}\}$	Ans: A
7	$f(g(x)) = f(x+2)$ $= (x+2)^2$ $= x^2+4x+4$	Ans: D
8	fog — one-one $g \rightarrow$ one-one	Ans: B
9	$fof^{-1} = I_B$	Ans: B
10.	$gof: A \rightarrow C$ need not be bijection	Ans: C

JEE MAINS LEVEL

14

01. $x^2 - 5x + 6 = 0$

$\Rightarrow (x-2)(x-3) = 0$

$\Rightarrow x = 2$ or 3

Ans : B

02. $10x - 7 = y$

$\Rightarrow x = \dfrac{y+7}{10}$

$\Rightarrow f^{-1}(x) = \dfrac{x+7}{10}$

$\therefore g(x) = f^{-1}(x)$

$= \dfrac{x+7}{10}$

Ans: C

03 $f(g(a)) + f(g(b))$

$= f(a^3) + f(b^3)$

$= \log a^3 + \log b^3$

$= \log(ab)^3$

option: B $f(g(ab))$

$= f((ab)^3)$

$= \log(ab)^3$

Ans: B

04. $f(x) = \dfrac{1}{1-x}$

$\dfrac{1}{1-x} = y$

$\Rightarrow 1 - x = \dfrac{1}{y}$

$\Rightarrow x = 1 - \dfrac{1}{y}$

$\Rightarrow x = \dfrac{y-1}{y}$

$\Rightarrow f^{-1}(x) = \dfrac{x-1}{x}$

Ans: D

15

06 $f(f(x)) = x$

$\Rightarrow f\left(\frac{\alpha x}{x+1}\right) = x$

$\Rightarrow \frac{\alpha\left(\frac{\alpha x}{x+1}\right)}{\left(\frac{\alpha x}{x+1}\right)+1} = x$

$\Rightarrow \frac{\alpha^2}{\alpha x + x + 1} = 1$

$\Rightarrow \alpha^2 = \alpha x + x + 1$

$\Rightarrow \alpha^2 = (\alpha+1)x + 1$

Comparing coeff of x on b/s

$\alpha + 1 = 0 \Rightarrow \alpha = -1$

Ans. D

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07 $(f\circ g)(\pi) + (g\circ f)(e)$

$= f(g(\pi)) + g(f(e))$ $\pi \rightarrow$ Irrational

$= f(0) + g(0)$ $e \rightarrow$ rational

$= 0 + (-1)$

$= -1$

Ans: A

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08 Opt: A $f(x) = \sin^2 x$, $g(x) = \sqrt{x}$

$g(f(x)) = g(\sin^2 x) = \sqrt{\sin^2 x} = |\sin x|$

$f(g(x)) = f(\sqrt{x}) = \sin^2\sqrt{x} = (\sin\sqrt{x})^2$

Ans : A

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16

09. $n(A) = n, \quad n(B) = 3$

No. of onto functions $= 3^n - {}^3C_1(3-1)^n + {}^3C_2(3-2)^n$

$= 3^n - 3 \cdot 2^n + 3$

$= 3^n - 3(2^n - 1)$

Ans: D

10. $gof\left(\frac{a+1}{4}\right) = g\left(f\left(\frac{a+1}{4}\right)\right)$

$= g\left(4\left(\frac{a+1}{4}\right) - 1\right)$

$= g(a)$

$= a^3 + 2$

Ans: C

11. $fog(x) = f(g(x))$

$= f(2)$

$= 1$

Ans: D

12. A) $f(g(x)) = f\left(\frac{1}{x^2}\right)$

$= x^2$ (True)

B) $h(g(x)) = h\left(\frac{1}{x^2}\right) = \left(\frac{1}{x^2}\right)^2 = \frac{1}{x^4} = (g(x))^2$

(True)

c) $h\left(\frac{1}{x^2}\right) = \frac{1}{x^4}$ (True)

D) $f(g(x)) = f\left(\frac{1}{x^2}\right) = x^2 = h(x)$ (True)

Ans: A, B, C, D.

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13. **Statement I**

$$f(x) = \frac{1}{1-x}$$

$$\Rightarrow \frac{1}{1-x} = y$$

$$\Rightarrow 1-x = \frac{1}{y}$$

$$\Rightarrow x = 1 - \frac{1}{y}$$

$$\Rightarrow x = \frac{y-1}{y}$$

$$f^{-1}(x) = \frac{x-1}{x}$$

(True)

17

Statement II :

$$\frac{x-1}{x+1} = y$$

$$\Rightarrow x-1 = xy+y$$

$$\Rightarrow x - xy = 1+y$$

$$\Rightarrow x(1-y) = 1+y$$

$$x = \frac{1+y}{1-y}$$

$$f^{-1}(x) = \frac{1+x}{1-x}$$

$$f(f^{-1}(x)) = f\left(\frac{1+x}{1-x}\right)$$

$$= \frac{\frac{1+x}{1-x} - 1}{\frac{1+x}{1-x} + 1} = \frac{\cancel{1}+x-\cancel{1}+x}{1+\cancel{x}+1-\cancel{x}} = \frac{2x}{2} = x$$

(True

Ans: A

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14. $5x+3 = y$

Statement I (True)

$$x = \frac{y-3}{5}$$

$$f^{-1}(x) = \frac{x-3}{5} = S(x)$$

Statement II: Conceptual (True)

Ans: A

15. Given $f(-x) = -f(x)$, $f(x+1) = x+1$ 18

and $f\left(\frac{1}{x}\right) = \frac{f(x)}{x^2}$, $\forall x \neq 0$

The only function satisfies the above functions is $f(x) = x$

Ans : A

16 $f(x) = x \Rightarrow f^{-1}(x) = x$

$\therefore (f^{-1} \circ f^{-1} \circ \dots f^{-1})(1) = 1$ Ans : D

17 $f^{-1}(2010) = 2010$

Ans : A

19 $f \circ g(x^2+1) = f(g(x^2+1))$

$= f((x^2+1)^2 + 1)$

$= f(x^4 + 2x^2 + 2)$

$= 3(x^4 + 2x^2 + 2) - 2$

$= 3x^4 + 6x^2 + 4$ Ans : A

18. $f \circ g(-1) = f(g(-1))$

$= f(3(-1) - 4)$

$= f(-7)$

$= (-7)^2 + 2(-7) - 3$

$= 49 - 14 - 3$

$= 32$ Ans : B

20. $[g\circ(f\circ f)](2) = g(f(f(2)))$ 19

$= g(f(2\cdot 2+1))$

$= g(f(5))$

$= g(2\cdot 5+1)$

$= g(11)$

$= (11)^2+1 = 122$

Ans: 122

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21. $f(g(x)) = 25$

$\Rightarrow f(x^2+7) = 25$

$\Rightarrow 2(x^2+7)+3 = 25$

$\Rightarrow 2x^2 \cancel{+} - 8 = 0$

$\Rightarrow x^2 = 4$

$\Rightarrow x = \pm 2$

Ans: ± 2

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22. $f(f(f(0)))+1$

$= f(f(3\cdot 0+2))+1$

$= f(f(2))+1$

$= f(3\cdot 2+2)+1$

$= f(8)+1$

$= 3\cdot 8+2+1$

$= 27$

Ans: 27

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23. a) $f(x) = 4x+1$

$\Rightarrow f^{-1}(x) = \frac{x-1}{4}$

$f^{-1}(-3) = \frac{-3-1}{4} = -1$

23 a) $f(x) = 4x+1$

(20)

$\Rightarrow f^{-1}(x) = \frac{x-1}{4}$

$\Rightarrow f^{-1}(-3) = \frac{-3-1}{4} = -1$

b) $f(x) = x+4$

$\Rightarrow f^{-1}(x) = x-4$

$\Rightarrow f^{-1}(5) = 5-4 = 1$

c) $f(x) = 3x-5$

$\Rightarrow f^{-1}(x) = \frac{x+5}{3}$

$\Rightarrow f^{-1}(-23) = \frac{-23+5}{3} = -6$

d) $f(x) = 5x+2$

$\Rightarrow f^{-1}(x) = \frac{x-2}{5}$

$\Rightarrow f^{-1}(-3) = \frac{-3-2}{5} = -1$

Ans: s, t, p, s

~~24~~ a)

24) a) $f(-5)+f(-4)$

(21)

$= (-5+4) + 3(-4)+2$

$= -11$

b) $f(|f(-8)|)$

$= f(|-8+4|)$

$= f(|-4|)$

$= f(4)$

$= 3\cdot4+2 = 14$

c) $f(f(-7)) + f(3)$

$= f(-7+4) + f(3)$

$= f(-3) + f(3)$

$= 3(-3)+2 + 3(3)+2$

$= 4$

d) $f(f(f(0))) + 2$

$= f(f(3\cdot0+2)) + 2$

$= f(f(2)) + 2$

$= f(3\cdot2+2) + 2$

$= f(8) + 2$

$= 8-4+2$

$= 6$

Ans: S, Q, P, t

ADDITIONAL PRACTICE QUESTIONS

22

01. $[h\circ(g\circ f)]\left(\sqrt{\frac{\pi}{4}}\right)$

$= h\left[g\left(f\left(\sqrt{\frac{\pi}{4}}\right)\right)\right]$

$= h\left[g\left(\frac{\pi}{4}\right)\right]$

$= h[1]$ Ans: C

$= 0$

02. $f(x) = \log\left(x + \sqrt{x^2+1}\right)$

$f(x) + f(-x) = \log\left(x + \sqrt{x^2+1}\right) + \log\left(\sqrt{x^2+1} - x\right)$

$= \log\left((x^2+1) - x^2\right)$

$= \log(1) = 0$

$\therefore f(-x) = -f(x)$

f is odd function

03 $f(n) = (-1)^{n-1}(n-1)$, $g(n) = n - f(n)$

let $n=1$, $f(1) = 0$, $g(1) = 1$

Now $g\circ g(1) = g(g(1))$

$= g(1)$

$= 1$ Ans: 1

23

04 $f(x) = 5x-3$

$\Rightarrow f^{-1}(x) = \frac{x+3}{5}$

$\Rightarrow f^{-1}(3) = \frac{3+3}{5} = \frac{6}{5}$

$(g \circ f^{-1})(3) = g(f^{-1}(3)) = g\left(\frac{6}{5}\right)$

$= \boxed{\cancel{5\left(\frac{6}{5}\right) - 3 = 3}}$

$= \left(\frac{6}{5}\right)^2 + 3 = \frac{111}{25}$ Ans: B

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05 $f(g(x)) = f\left(\frac{x}{\sqrt{1+x^2}}\right)$

$= \frac{\left(\frac{x}{\sqrt{1+x^2}}\right)}{\sqrt{1-\left(\frac{x}{\sqrt{1+x^2}}\right)^2}}$

$= \frac{x}{1} = x$ Ans: A

$\Rightarrow$ THE END $\in$