

## Composition

1. If  $f(x) = ax + b$  and  $g(x) = cx + d$ , then  $f(g(x)) = g(f(x))$  is equivalent to [UPSEAT 2001]

- (a)  $f(a) = g(c)$                       (b)  $f(b) = g(b)$   
 (c)  $f(d) = g(b)$                       (d)  $f(c) = g(a)$

2. If  $f$  be the greatest integer function and  $g$  be the modulus function, then  $(gof)\left(-\frac{5}{3}\right) - (fog)\left(-\frac{5}{3}\right) =$

- (a) 1                                      (b) -1  
 (c) 2                                      (d) 4

3. If  $f(x) = 2x$  and  $g$  is identity function, then

- (a)  $(fog)(x) = g(x)$                       (b)  $(g + g)(x) = g(x)$   
 (c)  $(fog)(x) = (g + g)(x)$               (d) None of these

4. If  $f(x) = x^2 - 1$  and  $g(x) = 3x + 1$ , then  $(gof)(x) =$

- (a)  $x^2 - 1$                               (b)  $2x^2 - 1$   
 (c)  $3x^2 - 2$                               (d)  $2x^2 + 2$

5. If  $f$  is an exponential function and  $g$  is a logarithmic function, then  $fog(1)$  will be

- (a)  $e$                                       (b)  $\log_e e$   
 (c) 0                                      (d)  $2e$

6. If  $f(x) = e^{2x}$  and  $g(x) = \log \sqrt{x}$  ( $x > 0$ ), then  $fog(x)$  is equal to

- (a)  $e^{2x}$                                       (b)  $\log \sqrt{x}$   
 (c)  $e^{2x} \log \sqrt{x}$                       (d)  $x$

7. If  $f(x) = |\cos x|$  and  $g(x) = [x]$ , then  $gof(x)$  is equal to

- (a)  $|\cos [x]|$                               (b)  $|\cos x|$   
 (c)  $[|\cos x|]$                               (d)  $|\cos x|$

8. If  $f(x) = x^2 + 1$ , then  $fof(x)$  is equal to

- (a)  $x^2 + 1$                               (b)  $x^2 + 2x + 2$   
 (c)  $x^4 + 2x^2 + 2$                       (d) None of these

9. If  $f(x) = \frac{x}{\sqrt{1+x^2}}$ , then  $(fofof)(x) =$  [RPET 2000]

- (a)  $\frac{3x}{\sqrt{1+x^2}}$                               (b)  $\frac{x}{\sqrt{1+3x^2}}$   
 (c)  $x$                                       (d) None of these

10. If  $\phi(x) = x^2 + 1$  and  $\psi(x) = 3^x$ , then  $\phi\{\psi(x)\}$  and  $\psi\{\phi(x)\} =$

- (a)  $3^{2x+1}, 3^{x^2+1}$                       (b)  $3^{2x+1}, 3^{x^2} + 1$   
 (c)  $3^{2x} + 1, 3^{x^2+1}$                       (d) None of these

11. If  $g(x) = x^2 + x - 2$  and  $\frac{1}{2}g \circ f(x) = 2x^2 - 5x + 2$ , then  $f(x)$  is [Roorkee 1998; MP PET 2002]

- (a)  $2x - 3$  (b)  $2x + 3$   
 (c)  $2x^2 + 3x + 1$  (d)  $2x^2 - 3x - 1$

12. If  $f(x) = \log_a x$  and  $F(x) = a^x$ , then  $F[f(x)]$  is [SCRA 1996]

- (a)  $f[F(x)]$  (b)  $f[F(2x)]$   
 (c)  $F|f(2x)|$  (d)  $F[(x)]$

13. Let  $f$  and  $g$  be functions defined by  $f(x) = \frac{x}{x+1}$ ,  $g(x) = \frac{x}{1-x}$ , then  $(f \circ g)(x)$  is [SCRA 1996]

- (a)  $\frac{1}{x}$  (b)  $\frac{1}{x-1}$   
 (c)  $x-1$  (d)  $x$

14. If from  $R \rightarrow R$ ,  $f(x) = (x+1)^2$ ,  $g(x) = x^2 + 1$ , then  $(f \circ g)(-3)$  equals [RPET 1999]

- (a) 121 (b) 112  
 (c) 211 (d) None of these

15. Suppose that  $g(x) = 1 + \sqrt{x}$  and  $f(g(x)) = 3 + 2\sqrt{x} + x$ , then  $f(x)$  is [MP PET 2000; Karnataka CET 2002]

- (a)  $1 + 2x^2$  (b)  $2 + x^2$   
 (c)  $1 + x$  (d)  $2 + x$

16. The composite mapping  $f \circ g$  of the map  $f: R \rightarrow R$ ,  $f(x) = \sin x$ ,  $g: R \rightarrow R$ ,  $g(x) = x^2$  is [UPSEAT 2000]

- (a)  $\sin x + x^2$  (b)  $(\sin x)^2$   
 (c)  $\sin x^2$  (d)  $\frac{\sin x}{x^2}$

17. Let  $f(x) = ax + b$  and  $g(x) = cx + d$ ,  $a \neq 0$ ,  $c \neq 0$ . Assume  $a = 1$ ,  $b = 2$ . If  $(f \circ g)(x) = (g \circ f)(x)$  for all  $x$ , what can you say about  $c$  and  $d$  [AMU 2000]

- (a)  $c$  and  $d$  both arbitrary (b)  $c = 1$ ,  $d$  arbitrary  
 (c)  $c$  arbitrary,  $d = 1$  (d)  $c = 1$ ,  $d = 1$

### Answer Key

Que.	1	2	3	4	5	6	7	8	9
Ans.	b	a	c	c	b	d	c	c	b
Aue.	10	11	12	13	14	15	16	17	18
Ans.	c	a	a	d	a	b	c	b	