1. If $\sin\alpha = 12/13$, where $0 < \alpha < \pi/2$ and $\cos\beta = -3/5$, where $\pi < \beta < 3\pi/2$, then the value of $\cos(\alpha+\beta)$ is

   (a) $33/65$ (b) $63/65$ (c) $-33/65$ (d) $-63/65$

2. The value of $\sin 50° - \sin 70° + \sin 10°$ is equal to

   (a) 1 (b) 0 (c) $1/2$ (d) 2

3. The value of $(\sin 20° \sin 40° \sin 60° \sin 80°)$ is equal to

   (a) $-3/16$ (b) $5/16$ (c) $3/16$ (d) $-5/16$

4. If $\sin\theta + \operatorname{cosec}\theta = 2$, then $\sin^2\theta + \operatorname{cosec}^2\theta$ is equal to

   (a) 1 (b) 4 (c) 2 (d) None of these

5. The expression
   $3\left[\sin^4(3\pi/2-\alpha)+\sin^4(3\pi+\alpha)\right]-2\left[\sin^6(\pi/2+\alpha)+\sin^6(5\pi-\alpha)\right]$ is equal to

   (a) 0 (b) 1 (c) 3 (d) $\sin 4\alpha + \cos 6\alpha$

6. If $x = \cos 10° \cos 20° \cos 40°$, then the value of x is

   (a) $(1/4)\tan 10°$ (b) $(1/8)\cot 10°$ (c) $(1/8)\operatorname{cosec} 10°$ (d) $(1/8)\sec 10°$

7. The value of $\sin(45°+\theta) - \cos(45°-\theta)$ is

   (a) $2\cos\theta$ (b) 0 (c) $2\sin\theta$ (d) 1

8. If $\sin x + \cos y = a$ and $\cos x + \sin y = b$, then $\tan\dfrac{x-y}{2}$ is equal to

   (a) $a+b$ (b) $a-b$ (c) $\dfrac{a+b}{a-b}$ (d) $\dfrac{a-b}{a+b}$

9. $\sin(36°+A) - \sin(36°-A) + \sin(72°-A) - \sin(72°+A)$ is equal to

   (a) 0 (b) 1 (c) $\sin A$ (d) $\cos A$

10. If $\dfrac{\cos x}{a} = \dfrac{\cos(x+\theta)}{b} = \dfrac{\cos(x+2\theta)}{c} = \dfrac{\cos(x+3\theta)}{d}$, then $\dfrac{a+c}{b+d}$ is equal to

    (a) a/d (b) c/b (c) b/c (d) d/a

11. If $\cos(x-y) = a\cos(x+y)$, then $\cot x \cot y$ is equal to

    (a) $\dfrac{a-1}{a+1}$ (b) $\dfrac{a+1}{a-1}$ (c) $a-1$ (d) $a+1$

12. If $\cos\theta + \sin\theta = a$, $\cos 2\theta = b$, then

    (a) $a^2 = b^2(2-a^2)$ (b) $b^2 = a^2(2-b^2)$ (c) $b^2 = a^2(2-a^2)$ (d) $a^2 = b^2(2-b^2)$

13. $\cos(B-C)+\cos(C-A)+\cos(A-B)=-\frac{3}{2}$ is true if and only if

(a) $\cos A+\cos B-\cos C=0$

(b) $\sin A+\sin B+\sin C=0$

(c) $\cos A+\cos B+\cos C=\sin A+\sin B+\sin C$

(d) $\cos A+\cos B+\cos C=\sin A+\sin B+\sin C=0$

14. If $\sec A-\tan A=1/4,$ then

(a) $\sin 2A=8/17$ (b) $\cos A=15/17$

(c) $\sin A+\cos A=23/17$ (d) $\cos A-\sin A=7/17$

15. If $\cos\alpha+\cos\beta=a,\ \sin\alpha+\sin\beta=b,$ then $\cos(\alpha-\beta)$ is equal to

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

16. Let $0<x<\frac{\pi}{4}.$ Then $(\sec 2x-\tan 2x)$ equals

(a) $\tan\left(x-\frac{\pi}{4}\right)$ (b) $\tan\left(\frac{\pi}{4}-x\right)$ (c) $\tan\left(x+\frac{\pi}{4}\right)$ (d) $\tan^2\left(x+\frac{\pi}{4}\right)$

17. The maximum value of $(\cos\alpha_1).(\cos\alpha_2)...(\cos\alpha_n)$ under the restrictions $0\le\alpha_1,\ \alpha_2,\ ...\alpha_n\le\frac{\pi}{2}$ and $(\cot\alpha_1).(\cot\alpha_2)...(\cot\alpha_n)=1$ is

(a) $\frac{1}{2^{n/2}}$ (b) $\frac{1}{2^n}$ (c) $\frac{1}{2n}$ (d) 1

18. If $\alpha+\beta=\frac{\pi}{2}$ and $\beta+\gamma=\alpha,$ then $\tan\alpha$ equals

(a) $2(\tan\beta+\tan\gamma)$ (b) $\tan\beta+\tan\gamma$

(c) $\tan\beta+2\tan\gamma$ (d) $2\tan\beta+\tan\gamma$

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