

### Short Questions

Write the short answers of the following:

**Q.1** Prove that:  $\cos(-\beta) = \cos\beta$

**Q.2** Prove that:  $\sin(-\theta) = -\sin\theta$

**Q.3** Prove that:  $\tan(-\theta) = -\tan\theta$

**Q.4**  $\cos\left(\frac{\pi}{2} - \beta\right) = \sin\beta$

**Q.5** Prove that  $\sin\left(\frac{\pi}{2} - \theta\right) = \cos\theta$

**Q.6**  $\sin(\pi + \theta) = -\sin\theta$

**Q.7** Show that:  $\sin(\alpha + \beta) + \sin(\alpha - \beta) = 2\sin\alpha \cos\beta$

**Q.8**  $\cos(\alpha + \beta) - \cos(\alpha - \beta) = -2\sin\alpha \sin\beta$

**Q.9** Prove that:  $\sin\left(\theta + \frac{\pi}{6}\right) + \cos\left(\theta + \frac{\pi}{3}\right) = \cos\theta$

**Q.10** Prove that:  $\tan(45^\circ + \theta) \tan(45^\circ - \theta) = 1$

**Q.11** Express:  $\sin x \cos 2x - \sin 2x \cos x$  as single term

**Q.12** Express:  $\cos(a+b)\cos(a-b) - \sin(a+b)\sin(a-b)$  as single term.

**Q.13** Prove that:  $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$

**Q.14** Prove that:  $\tan 2\alpha = \frac{2 \tan \alpha}{1 - \tan^2 \alpha}$

**Q.15** Prove that:  $\sin^2 \alpha = \frac{1 - \cos 2\alpha}{2}$

**Q.16** Prove that:  $\cos^2 \alpha = \frac{1 + \cos 2\alpha}{2}$

**Q.17** If  $\sin \theta = \frac{4}{5}$  and the terminal side of  $\theta$  lies in 1<sup>st</sup> quadrant, find  $\cos \frac{\theta}{2}$

**Q.18** Prove that:  $\sin \alpha = 2 \sin \frac{\alpha}{2} \cos \frac{\alpha}{2}$

**Q.19** Prove that:  $\cos \alpha = \cos^2 \frac{\alpha}{2} - \sin^2 \frac{\alpha}{2}$

**Q.20** Express the sum as product:  $\cos 12 \theta + \cos 4 \theta$

**Q.21** Express  $\cos \theta - \cos 4 \theta$  as product:

**Q.22** Express as sum or difference  $2 \cos 5 \theta \sin 3 \theta$

**Q.23** Express as sum or difference  $\cos 3 \theta \cos \theta$

**Q.24** Express  $\sin(x + 30^\circ) + \sin(x - 30^\circ)$  as product

**Q.25** Find  $\cos \theta$  if  $\sin \theta = \frac{7}{25}$  and angle  $\theta$  is an acute angle.

### Answers

Q.11  $-\sin x$                       Q.12  $\cos 2a$                       Q.17  $\frac{2}{\sqrt{5}}$

Q.20  $2 \cos 8 \theta \cos 4 \theta$                       Q.21  $2 \sin \frac{5\theta}{2} \sin \frac{3\theta}{2}$

Q.22  $\sin 8 \theta - \sin 2 \theta$                       Q.23  $\frac{1}{2} [ \cos 4 \theta + \cos 2 \theta ]$

Q.24  $2 \sin x \cos 30^\circ$                       Q.25  $\frac{24}{25}$