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Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1. Select and write the correct answer.

(4)

1. $1 - \frac{\sin^2 \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} - \frac{\sin \theta}{1 - \cos \theta}$ equals

- A) 0 B) 1
C) $\sin \theta$ D) $\cos \theta$

2. If $\operatorname{cosec} \theta + \cot \theta = \frac{11}{2}$, then $\tan \theta =$

- A) $\frac{21}{22}$ B) $\frac{15}{16}$
C) $\frac{44}{117}$ D) $\frac{117}{44}$

Q.2. Answer the following.

(3)

1. Find the trigonometric function of 270°
2. Find the trigonometric functions of 30°
3. State the signs of $\sin 986^\circ$

Section B
Attempt any Four

Q.3 Eliminate θ from the following $x = 6 \operatorname{cosec} \theta$, $y = 8 \cot \theta$

(2)

Q.4 Prove the following identities.

(2)

$$(\cos^2 A - 1)(\cot^2 A + 1) = -1$$

Q.5 Using table evaluate $\cos^2 0 + \cos^2 \frac{\pi}{6} + \cos^2 \frac{\pi}{3} + \cos^2 \frac{\pi}{2}$

(2)

Q.6 Prove the following :

(2)

$$(1 + \tan A \times \tan B)^2 + (\tan A - \tan B)^2 = \sec^2 A \times \sec^2 B$$

Q.7 Prove the following identities :

(2)

$$\frac{1 - \sec \theta + \tan \theta}{1 + \sec \theta - \tan \theta} = \frac{\sec \theta + \tan \theta + 1}{\sec \theta + \tan \theta + 1}$$

Q.8 State the signs of $\cos 4^c$ and $\cos 4^\circ$. Which of these two functions is greater?

(2)

Section C
Attempt any Two

Q.9 Find the trigonometric function of 315° (3)

Q.10 Prove the following : (3)

$$\frac{1 + \cot \theta + \operatorname{cosec} \theta}{1 - \cot \theta + \operatorname{cosec} \theta} = \frac{\operatorname{cosec} \theta + \cot \theta - 1}{\cot \theta - \operatorname{cosec} \theta + 1}$$

Q.11 Find the trigonometric function of -180° (3)

Section D
Attempt any One

Q.12 Prove the following : (4)

$$\left(\tan \theta + \frac{1}{\cos \theta} \right)^2 + \left(\tan \theta - \frac{1}{\cos \theta} \right)^2 = 2 \left(\frac{1 + \sin^2 \theta}{1 - \sin^2 \theta} \right)$$

Q.13 If $2 \sin A = 1 = \sqrt{2} \cos B$ and $\frac{\pi}{2} < A < \pi, \frac{3\pi}{2} < B < 2\pi$, then find the value of (4)

$$\frac{\tan A + \tan B}{\cos A - \cos B}$$