

## PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each question carries 15 marks.)

## UNIT — I

- III (a) Prove that  $\sqrt{\frac{1+\cos A}{1-\cos A}} = \operatorname{cosec} A + \cot A$  5
- (b) Prove that  $\frac{\cos(90+A) \sec(360+A) \tan(180-A)}{\sec(A-720) \sin(540+A) \cot(A-90)} = 1$ . 5
- (c) If  $x = 3 \cos \theta + 4 \sin \theta$  is written in the form  $x = r \sin(\theta + \alpha)$ ; find  $r$ . 5

OR

- IV (a) Prove that  $\frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta}{1+\sin \theta} = 2 \sec \theta$  5
- (b) If  $\theta = 30^\circ$ , verify that  $\tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta}$  5
- (c) The rope supporting a flag post is fixed to the ground 20m away from the post making an angle of elevation  $45^\circ$  of the ground. Find the length of the rope and the height of the post. 5

## UNIT — II

- V (a) Prove that  $\cos 4\theta = 1 - 8 \sin^2 \theta \cos^2 \theta$ . 5
- (b) Prove that  $\frac{\sin A + \sin 3A + \sin 5A}{\cos A + \cos 3A + \cos 5A} = \tan 3A$ . 5
- (c) Find the smallest angle of triangle ABC, if  $a = 2\text{cm}$ ,  $b = 3\text{cm}$  and  $c = 4\text{cm}$ . 5

OR

- VI (a) Prove that  $\frac{\sin 3A}{\sin A} + \frac{\cos 3A}{\cos A} = 4 \cos 2A$ . 5
- (b) Show that  $\sin 33 + \cos 63 = \cos 3$ . 5
- (c) Prove that  $R(a^2 + b^2 + c^2) = abc (\cot A + \cot B + \cot C)$  5

## UNIT — III

- VII (a) Evaluate  $\lim_{x \rightarrow 5} \frac{x^3 - 125}{x^2 - 25}$ . 5
- (b) Find  $\frac{dy}{dx}$  if (i)  $x = a \sec \theta$ ,  $y = b \tan \theta$ .  
(ii)  $y = x^2 \cos x$  (3+2)
- (c) If  $y = A \cos Px + B \sin Px$ . Show that  $\frac{d^2y}{dx^2}$  is proportional to  $y$ . 5

OR