

## BANGABASI COLLEGE

FIRST YEAR CLASS TEST  
COMPLEX NUMBER  
MARKS-20 : TIME-40 MINS

Answer any four from the following questions:

- (1) Let  $z$  be variable complex number such that an amplitude of  $\frac{z-i}{z+i}$  is  $\frac{\pi}{4}$ . Show that the point  $z$  lies on a circle in the complex plane.
- (2) Prove that  $\cos \frac{\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} + \cos \frac{7\pi}{13} + \cos \frac{9\pi}{13} + \cos \frac{11\pi}{13} = \frac{1}{2}$ .
- (3) Find the general solution of  $\cos z = 2$ .
- (4) Find the amp  $z$  and mod  $z$  where

$$z = 1 + \cos 2\theta - i \sin 2\theta, \dots \frac{\pi}{2} < \theta < \pi$$

- (5) If  $2 \cos \theta = t$  prove that

$$\frac{1 + \cos 7\theta}{1 + \cos \theta} = (t^3 - t^2 - 2t + 1)^2$$

DEPT. OF MATHEMATICS, DATE-9TH JANUARY, 2017