

## Question Bank (G scheme)

Name of subject: Basic Mathematics  
Subject code: 17104  
Semester: I

Unit Test :II  
Course : CH/CM/EJ/IE/IF/IS/ME

### Chapter 1 (TRIGONOMETRY)[40 marks]

#### 3 marks-

- 1) If  $\sin A = 0.4$ , find  $\sin 3A$ .
- 2) Prove that  $\sin 2\theta = 2 \sin\theta \cos\theta$
- 3) Without using calculator find the value of  $\frac{\tan 66^\circ + \tan 69^\circ}{1 - \tan 66^\circ \tan 69^\circ}$
- 4) Find  $x$  if  $\sin^{-1}\left(\frac{3}{5}\right) = \tan^{-1} x$
- 5) Prove that  $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \left[ \frac{x+y}{1-xy} \right]$
- 6) Express as product and evaluate without using calculator:  $\sin 99^\circ - \sin 81^\circ$

#### 4 marks-

- 1) Prove that  $\cos(A + B) = \cos A \cdot \cos B - \sin A \cdot \sin B$
- 2) Prove that  $\frac{\sin 7x + \sin x}{\cos 5x - \cos 3x} = \sin 2x - \cos 2x \cdot \cot x$
- 3) Prove that  $\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) - \tan^{-1}\left(\frac{8}{19}\right) = \frac{\pi}{4}$
- 4) In  $\Delta ABC$ , Prove that  $\tan A + \tan B + \tan C = \tan A \cdot \tan B \cdot \tan C$
- 5) Prove that  $\sin 3A = 3 \sin A - 4 \sin^3 A$
- 6) Without using calculator Prove that  $\tan 70^\circ - \tan$   
 $50^\circ - \tan 20^\circ = \tan 70^\circ \cdot \tan 50^\circ \cdot \tan 20^\circ$
- 7) Without using calculator Prove that  $\frac{\sin 19^\circ + \cos 11^\circ}{\cos 19^\circ - \cos 11^\circ} = \sqrt{3}$
- 8) Prove that  $\frac{\cos 3A}{\cos A} + \frac{\sin 3A}{\sin A} = 4 \cos 2A$
- 9) Prove that  $\tan^{-1}(1) + \tan^{-1}(2) + \tan^{-1}(3) = \pi$
- 10) Prove that  $\sin C + \sin D = 2 \sin\left(\frac{C+D}{2}\right) \cdot \cos\left(\frac{C-D}{2}\right)$

### Chapter- 2 (STRAIGHT LINE)[16marks]

#### 3 marks:

- 1) Find the distance between the point  $(-2, 3)$  and the line  $3x + 2y + 26 = 0$

- 2) Find the distance between two parallel lines  $3x + 2y - 6 = 0$  and  $6x + 4y - 8 = 0$
- 3) Find the equation of straight line whose  $y$  – intercept is 4 units and inclination is equal to  $150^\circ$ .
- 4) Find the equation of line passing through the point (2, 5) and parallel to the line  $6x + 2y = 12$

**4 marks:**

- 5) If  $m_1$  and  $m_2$  are the slope of the two lines then prove that angle between the lines is  $\theta = \tan^{-1} \left| \frac{m_1 - m_2}{1 + m_1 m_2} \right|$
- 6) Find the equation of line passing through the point of intersection of the lines  $2x + 3y = 13$  and  $5x - y = 7$  and perpendicular to the line  $3x - y + 17 = 0$
- 7) Find the equation of the line passing through the point of intersection of the lines  $4x + 3y = 8$ ,  $x + y = 1$  and parallel to the line  $5x - 7y = 3$ .
- 8) Find the acute angle between the lines  $y = 5 + 6$  and  $y = x$ .
- 9) Find K so that the line through (2, K) and (-3, 5) is parallel to the line through (-1, 5) and (0, 7).
- 10) Find the equation of a line passing through the points (6, -4) and (-3, 8). Also find its slope and intercepts.
- 11) A line intersects the  $x$ -axis at A and  $y$ -axis at B. If the midpoint of seg AB is (3, 4), find its equation.
- 12) Find the equation of the line which passes through (4, 3) having equal intercepts.
- 13) The acute angle between two line is  $(\pi/4)^\circ$  and the slope of one of the two lines is  $1/2$ , find the slope of the other line.
- 14) Find the equation of the perpendicular bisector of the line joining the points (4, 8) and (-2, 6).