

# Assignment 1

EE24BTECH11002 - Agamjot Singh\*

## C. MCQs WITH ONE CORRECT ANSWER

- 5) The general solution of the trigonometric equation  $\sin x + \cos x = 1$  is given by:  
(1981 – 2Marks)
- (a)  $x = 2n\pi; n = 0, \pm 1, \pm 2 \dots$   
 (b)  $x = 2n\pi + \frac{\pi}{2}; n = 0, \pm 1, \pm 2 \dots$   
 (c)  $x = n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4}; n = 0, \pm 1, \pm 2 \dots$   
 (d) none of these
- 6) The value of the expression  $\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ$  is equal to  
(1988 – 2Marks)
- (a) 2 (b)  $2 \frac{\sin 20^\circ}{\sin 40^\circ}$   
 (c) 4 (d)  $4 \frac{\sin 20^\circ}{\sin 40^\circ}$
- 7) The general solution of  $\sin x - 3 \sin 2x + \sin 3x = \cos x - 3 \cos 2x + \cos 3x$   
(1989 – 2Marks)
- (a)  $n\pi + \frac{\pi}{8}$  (b)  $\frac{n\pi}{2} + \frac{\pi}{8}$   
 (c)  $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$  (d)  $2n\pi + \cos^{-1} \frac{3}{2}$
- 8) The equation  $(\cos p - 1)x^2 + (\cos p)x + \sin p = 0$  in the variable  $x$ , has real roots. Then  $p$  can take any value in the interval  
(1990 – 2Marks)
- (a)  $(0, 2\pi)$  (b)  $(-\pi, 0)$   
 (c)  $(-\frac{\pi}{2}, \frac{\pi}{2})$  (d)  $(0, \pi)$
- 9) Number of solutions of the equation  $\tan x + \sec x = 2 \cos x$  lying in the interval  $(0, 2\pi)$  is  
(1993 – 1Marks)
- (a) 0 (b) 1 (c) 2 (d) 3
- 10) Let  $0 < x < \frac{\pi}{4}$  then  $(\sec 2x - \tan 2x)$  equals  
(1994)
- (a)  $\tan(x - \frac{\pi}{4})$  (b)  $\tan(\frac{\pi}{4} - x)$   
 (c)  $\tan(x + \frac{\pi}{4})$  (d)  $\tan^2(x + \frac{\pi}{4})$
- 11) Let  $n$  be a positive integer such that  $\sin \frac{\pi}{2n} + \cos \frac{\pi}{2n} = \frac{\sqrt{n}}{2}$ . Then  
(1994)
- (a)  $6 \leq n \leq 8$  (b)  $4 < n \leq 8$   
 (c)  $4 \leq n \leq 8$  (d)  $4 < n < 8$
- 12) If  $\omega$  is an imaginary cube root of unity then the value of  $\sin((\omega^{10} + \omega^{23})\pi - \frac{\pi}{4})$  is  
(1994)
- (a)  $-\frac{\sqrt{3}}{2}$  (b)  $-\frac{1}{\sqrt{2}}$  (c)  $-\frac{1}{\sqrt{2}}$  (d)  $\frac{\sqrt{3}}{2}$
- 13)  $3(\sin x - \cos x)^4 + 6(\sin x + \cos x)^4 + 4(\sin^6 x + \cos^6 x) =$   
(1995S)
- (a) 11 (b) 12 (c) 13 (d) 14
- 14) The general values of  $\theta$  satisfying the equation  $2 \sin^2 \theta - 3 \sin \theta - 2 = 0$  is  
(1995S)
- (a)  $n\pi + (-1)^n \frac{\pi}{6}$  (b)  $n\pi + (-1)^n \frac{\pi}{2}$   
 (c)  $n\pi + (-1)^n \frac{5\pi}{6}$  (d)  $n\pi + (-1)^n \frac{7\pi}{6}$
- 15)  $\sec^2 \theta = \frac{4xy}{(x+y)^2}$  is true if and only if  
(1996 – 1Mark)
- (a)  $x + y = 0$  (b)  $x = y, x \neq 0$   
 (c)  $x = y$  (d)  $x \neq 0, y \neq 0$
- 16) In a triangle **PQR**,  $\angle R = \frac{\pi}{2}$ . If  $\tan \frac{P}{2}$  and  $\tan \frac{Q}{2}$  are the roots of the equation  $ax^2 + bx + c = 0$  ( $a \neq 0$ ) then  
(1999 – 2Marks)

(a)  $a + b = c$                       (b)  $b + c = a$

(c)  $a + c = b$                       (d)  $b = c$

17) Let  $f(\theta) = \sin \theta (\sin \theta + \sin 3\theta)$ . Then  $f(\theta)$  is  
(2000S)

(a)  $\geq 0$  only when  $\theta \geq 0$     (b)  $\leq 0$  for all real  $\theta$

(c)  $\geq 0$  for all real  $\theta$     (d)  $\leq 0$  only when  $\theta \leq 0$

18) The number of distinct real roots of

$$\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} \quad (1)$$

(2001S)

(a) 0            (b) 2            (c) 1            (d) 3

19) The maximum value of  $(\cos \alpha_1)(\cos \alpha_2)(\cos \alpha_3) \dots (\cos \alpha_n)$  under the restrictions

$$0 \leq \alpha_1, \alpha_2, \dots, \alpha_n \leq \frac{\pi}{2}$$

and

$$(\cot \alpha_1)(\cot \alpha_2)(\cot \alpha_3) \dots (\cot \alpha_n) = 1$$

(2001S)

(a)  $\frac{1}{2^{\frac{n}{2}}}$     (b)  $\frac{1}{2^n}$     (c)  $\frac{1}{2n}$     (d) 1