Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(BT) (2012 to 2017) (Sem.–3)

MATHEMATICS

Subject Code : BTBT-301

M.Code : 55071

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

a. Which term in the A.P. 5, 2, –1... is –22?

b. For what values of x the numbers $\frac{-2}{7}, x, \frac{7}{2}$ are in G.P.?

c. Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$.

d. Prove that $\cos 20 + \cos 100 + \cos 140 = 0$.

e. Find the centre and radius of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$.

f. Find the coordinates of the focus, axis and latus rectum of the parabola $y^2 = 8x$.

g. How many 3 letter words can be made using the letters of the word ORIENTAL?

h. Find the mean and standard deviation from median for the following data 3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21.

i. If a non-leap year is selected at random. What is the chance that it will contain 53 Sundays?

j. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$

SECTION-B

2. Find the sum of all 3 digit numbers which leave the remainder 1 when divided by 4.

3. Solve $\cos\theta - \sin\theta = -1$

4. Find the equation of circle passing through the points (2, 3) and (–1, 1) and whose centre is on the line $x - 3y - 11 = 0$.

5. A problem in statistics is given to three students A, B and C whose chances of solving it are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved?

6. Solve the system of equation $x + 3y + 6z = 2$, $3x - y + 4z = 9$, $x - 4y + 2z = 7$.

SECTION-C

7. Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & 1 \\ 1 & 1 & 3 \end{bmatrix}$

8. Find the mean, variance and standard deviation of the following data :

Class :	33-36	37-40	41-44	45-48	49-52
Frequency :	15	17	21	22	25

9. There are three bags: first containing 1 white, 2 red, 3 green balls; second 2 white, 3 red, 1 green balls and third 3 white, 1 red, 2 green balls. Two balls are drawn from a bag chosen at random. These are found to be one white and one red. Find the probability that the balls so drawn came from the second bag.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.