Roll No. .....

E–3896

B. C. A. (Part I, II, III) EXAMINATION, 2021

(New + Old Course)

(Only for Non-Mathematical Students)

BRIDGE COURSE

Time : Three Hours] [*Maximum Marks : 50*

[*Minimum Pass Marks : 20*

Note : All questions are compulsory. Attempt any *two* parts from each question. All questions carry equal marks.

Unit—I

1. (a) Is 184 a term of the sequence 3, 7, 11 ..... ?

   (b) Which term of the G. P. (geometric progression) 5, 10, 20, 40, ... is 5120 ?

   (c) If ω is one of the imaginary cube roots of unity, find the value of :

$$\Delta = \begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$$

   where $1 + \omega + \omega^2 = 0$.

Unit—II

2. (a) Expand $(x^2 + 2a)^5$ by binomial theorem.

   (b) How many permutations of the word 'RAIPUR' are there ?

   (c) If ${}^nC_8 = {}^nC_6$, find ${}^nC_2$.

Unit—III

3. (a) Find the value of tan 15°.

   (b) A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

   (c) Find the principal value of $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$.

Unit—IV

4. (a) If A (–2, 1); B (2, 3) and C (–2, – 4) are three points, find the angle between BA and BC.

   (b) Find the slope of the lines which make an angle of 45° with the line $3x - y + 5 = 0$.

   (c) Find the equation of the ellipse whose axes are along the coordinate axes, vertices are $(\pm 5, 0)$ and foci at $(\pm 4, 0)$.

Unit—V

5. (a) Compute the variance and standard deviation of the following observations of marks of 5 students of a tutorial group :

   Marks out of 25 : 8, 12, 13, 15, 22

(b) What do you understand by Central Tendency ? Find the mean from the following data :

x_i	f_i
3	8
9	10
17	12
23	9
27	5

(c) Calculate the mean deviation from the median for the following distribution :

x_i	f_i
10	7
15	3
20	8
25	5
30	6
35	8
40	4
45	9