Roll No. .....

CD-2860 (SE)

B. C. A. (Part I/II/III) EXAMINATION, 2020

(Only for Non-Mathematical Students)

BRIDGE COURSE

Time : Three Hours

Maximum Marks : 50

Minimum Pass Marks : 20

Note : Attempt any *two* parts from each Unit. All questions carry equal marks.

Unit—I

1. (a) Solve $1 + 6 + 11 + 16 + \ldots\ldots + x = 148$.

(b) If $x = 1 + a + a^2 + a^3 + \cdots\cdots, |a| < 1$

and $y = 1 + b + b^2 + b^3 + \cdots\cdots, |b| < 1$.

Prove that $1 + ab + a^2b^2 + a^3b^3 + \cdots\cdots = \dfrac{xy}{x + y - 1}$.

(c) Prove that :

$$\begin{vmatrix} x+y & y+z & z+x \\ z & x & y \\ 1 & 1 & 1 \end{vmatrix} = 0$$

Unit—II

2. (a) Prove that :

$$\sum_{r=0}^{n} {}^{n}C_{r} \cdot 3^{r} = 4^{n}$$

(b) If ${}^{22}P_{r+1} : {}^{20}P_{r+2} = 11:52$. Find r.

(c) Using the principle of mathematical induction, prove that $2^{3n} - 1$ is divisible by 7; for all $n \in N$.

Unit—III

3. (a) Prove that :

$$\frac{\sin(B-C)}{\cos B.\cos C} + \frac{\sin(C-A)}{\cos C.\cos A} + \frac{\sin(A-B)}{\cos A.\cos B} = 0$$

(b) Prove that :

$$\tan 3A = \frac{3\tan A - \tan^3 A}{1 - 3\tan^2 A}$$

(c) Solve the following equation :

$$\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4} .$$

Unit—IV

4. (a) Determine the ratio in which the line $3x + y - 9 = 0$ divides the line segment joining the point (1, 3) and (2, 7).

(b) Find the angle between the pair of straight lines :

$$x - y\sqrt{3} - 5 = 0 \text{ and } \sqrt{3x} + y - 7 = 0 .$$

(c) Find the equation of ellipse whose axes are along the co-ordinate axes, vertices are $(0, \pm 10)$ and eccentricity is $e = \frac{4}{5}$.

Unit—V

5. (a) 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

(b) The measurement of the diameter in millimeter of the heads of 107 screws are given. Calculate the standard deviation :

Diameter (in mm)	No. of Screws
33—35	17
36—38	19
39—41	23
42—44	21
45—47	27

(c) Find the mean for the following data :

Wages (upto)	No. of Workers
15	12
30	30
45	65
60	107
75	157
90	202
105	222
120	230

Wages upto ₹ and no. of workers are given as above.

1,950