

**Code No. : BC-200**

**Roll No. .... Total No. of Printed Pages : 5**

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**Online Annual Examination, 2022**

**B.C.A. Part I, II, III  
BRIDGE COURSE**

Time : Three Hours ] [ Maximum Marks : 50

*Note : Section 'A', containing 10 very short answer type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.*

**Section 'A'**

*Answer the following very short answer type questions in one or two sentences. 1 × 10 = 10*

1. Write the first 3 terms of the sequence which is defined by :

$$a_n = \frac{n}{n^2 + 1}$$

2. Convert the following angle in radian measurement :  
70°
3. Write the series of  $\log(1 + x)$ .

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4. Write the 8<sup>th</sup> term of the series  $(1 + x)^{11}$ .
5. Find the coefficient of  $x^5$  in  $(x + 3)^8$ .
6. On which axis do the following points lie :  
(a)  $(-5, 0)$                       (b)  $(6, 0)$
7. Find the mode of the following :  
12, 13, 17, 18, 11, 13, 21, 19 13.
8. Define Identity matrix.
9. Arithmetic mean of 4, 7,  $x$  and 9 is 7. Find the value of  $x$ .
10. Write the conditions for two lines are perpendicular to each other.

**Section 'B'**

*Answer the following short answer type questions with word limit 150-200. 3 × 5 = 15*

1. If the 6<sup>th</sup> term of a GP is 32 and its 8<sup>th</sup> term is 128, then find the value of the common ratio.

**Or**

Find the value of  $x$  and  $y$  from the following equation :

$$2 \begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$$

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2. Prove that :

$$\frac{{}^n C_r}{{}^n C_{r-1}} = \frac{n-r+1}{r}$$

**Or**

If  $\frac{e^{2y} - e^{-2y}}{2^{2y} + e^{-2y}} = \sin \alpha$ , then find the value of  $y$ .

3. If  $\operatorname{cosec} A = 2$ , find the value of  $\frac{1}{\tan A} + \frac{\sin A}{1 + \cos A}$ .

**Or**

Solve :  $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$ .

4. Find the focal distance of the point  $P(2, 0)$  on the ellipse  $3x^2 + 4y^2 = 12$ .

**Or**

Find the focus of the parabola  $y = x^2 - 2x + 3$ .

5. The mean of the 5 numbers is 27. If one of the number is excluded, the mean becomes 25. Determine excluded number.

**Or**

Obtain the median for the following frequency distribution :

$x :$	1	2	3	4	5	6	7	8	9
$f :$	8	10	11	16	20	25	15	9	6

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**Section 'C'**

*Answer the following long answer type questions with word limit 300-350.  $5 \times 5 = 25$*

1. Find the partial fraction of the function :

$$f(x) = \frac{1}{x^2 - 6x + 8}$$

**Or**

Find the inverse of :  $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$

2. Prove that  ${}^{2n} C_n = 2^n \frac{[1, 3, 5, \dots, (2n-1)]}{n!}$ .

**Or**

If  $(n+2)! = (1560)n!$ , find  $n$ !

3. Evaluate  $\sin \frac{\pi}{4} \cdot \cos \frac{\pi}{12} + \cos \frac{\pi}{4} \cdot \sin \frac{\pi}{12}$ .

**Or**

Prove that  $2 \tan^{-1} x = \tan^{-1} \left( \frac{2x}{1-x^2} \right)$

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4. Find the equation of the acute angle between the lines :  
 $3x + 4y - 11 = 0$  and  $12x - 5y - 2 = 0$

**Or**

Find the equation of the circle which touch the straight line  $12x - 5y + 10 = 0$  and whose center is  $(3, 4)$ .

5. Find the standard deviation of the following data :

$x$  : 4    8    11    17    20    24    31

$f$  : 3    5    9    5    4    3    1

**Or**

The mean of 4, 7, 2, 8, 6 and 9 is 7. Find mean deviation about median of these observations.

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