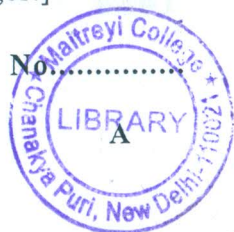


13 MAY 2022

13/5/22

[This question paper contains 8 printed pages.]

Your Roll No.



Sr. No. of Question Paper : 1484

Unique Paper Code : 42353405

Name of the Paper : Sec-2 Mathematical
Typesetting System: LaTeX

Name of the Course : B.Sc. Mathematical Science-
CBCS: Skill Enhancement

Semester : IV

Duration : 2 Hours Maximum Marks : 38

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **two** parts of each question.

1. (i) Define footnotes and write appropriate commands in Latex with example?
(ii) Write the input command in latex to produce the following :

P.T.O.

$$\int_0^1 x^5 \sqrt{\frac{1+x^2}{1-x^2}} dx.$$

(iii) What is the difference between the following commands in latex?

(a) \; and \:

(b) \ddots and \vdots.

(iv) Correct the following input as per Latex commands :

`\left \{ \frac{\mu. \tau}{\mu + \tau} \right \}`.

2. (i) Create a latex file for the following output :

Latex Assignment

XYZ

University of Delhi,

Delhi.

(ii) Explain the following environment with example :

(a) enumerate

(b) itemize

(c) math

(d) array

(iii) In an array environment, what is the meaning of these alignments: (c, l, r, and &) Justify these alignments with an example?

(iv) Define cases environment with example.

3. Write the code in LaTeX to get the following output : (4)

(a) $(y-a)^n \neq \sum_{k=0}^n a^{n-k}.$

(b) $(1+x)^{1/n} \neq 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \dots$

(c) $\sqrt[7]{\frac{a+b}{c+d}} + \sqrt[4]{g}.$

(d) Consider the sets B_1, B_2, B_3 .

Then $B_1 \cap (B_2 \cup B_3) = (B_1 \cap B_2) \cup (B_1 \cap B_3).$

4. Write the code in LaTeX to get the following output : (8)

(a) The Difference equation

$$x_t = ax_{t-1} + b_t (t = 1, 2, 3, \dots)$$

has the solution

$$x_t = ax_0 + \sum_{k=1}^t a^{t-k} b_k (t = 1, 2, 3, \dots)$$

(b) Define the discontinuous factor D_t by

$$D_t = \frac{1}{\prod_{s=1}^t (1+r_s)}$$

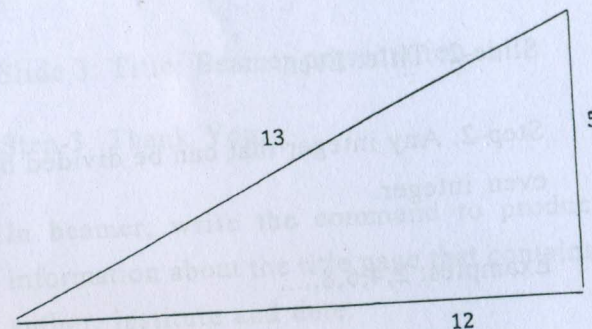
$$= \prod_{s=1}^t (1+r_s)$$

(c) $\int \frac{e^x}{\sqrt[3]{1+e^x}} = \frac{3}{2} (1+e^x)^{3/2} + C$

(d) $\sin x = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$

$$\sin(-1) = \frac{(-1)^0}{1!} - \frac{(-1)^3}{3!} + \frac{(-1)^5}{5!} - \frac{(-1)^7}{7!} + \dots$$

5. (a) Write the command in PSTricks to draw the following picture.



(b) Explain the command `\psarc (0,0) {2.5} {10} {80}`.

(c) Write the command to draw an arrow at (3,2) of length 15 units in the direction of (1,1).

(d) Write the command in PSTricks to plot the function $y = \sin x$. (6)

6. (a) Write a presentation in beamer with the following content :

Slide-1: Title: Odd

Step-1. Any integer that cannot be divided by 2 is an odd integer.

Examples: 1,3,5,7,....

Slide-2: Title: Even

Step-2. Any integer that can be divided by 2 is an even integer.

Examples: 2,4,6,8,....

Slide-3: Title: Composite

Step-3. Any integer that can be divided by atleast one other number (a factor not 1) other than itself.

Examples: 4, 6, 8, 10,

(b) Using beamer prepares a presentation with the following content :

Slide 1: Title: Beamer presentation

Step-1, $\sin \alpha$ and $\cos \alpha$ are two trigonometric functions.

Slide 2: Title: Some trigonometry identities:

Step-2.

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$2 \sin \theta \cos \theta = \sin 2\theta.$$

Slide 3: Title: Beamer presentation

Step-3. Thank You

(c) In beamer, write the command to produce the information about the title page that contains title, author, institute and date.

(d) Write a presentation in beamer with the following content:

Slide-1: Title: Differentiable function

Step-1. Let f be differentiable at $x = c$. Then

$$f'(c) = \lim_{x \rightarrow c} \left(\frac{f(x) - f(c)}{x - c} \right).$$

Slide-2: Title: Differentiable function

Step-2. Now

$$\begin{aligned} \lim_{x \rightarrow c} (f(x) - f(c)) &= \lim_{x \rightarrow c} \left(\frac{f(x) - f(c)}{x - c} \right) \times (x - c) \\ &= f'(c) \times 0. \end{aligned}$$

Slide-3: Title: Differentiable function

Step-3. $\lim_{x \rightarrow c} f(x) = f(c)$. Therefore, f is continuous at $x = c$.

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