

U.G. 3rd Semester Examination - 2021

MATHEMATICS

[PROGRAMME]

Skill Enhancement Course (SEC)

Course Code : MATH-G-SEC-T-1(A)&(B)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate marks.

Symbols and notations have their usual meanings.

Answer all the questions from selected Option.

OPTION-A

MATH(G)SEC-T-1A

1. Answer any **five** questions: 2×5=10
- What do you mean by implication? Give an example.
 - Define predicate with an example.
 - Write the truth table of conditional and biconditional statements.
 - Prove that for any set A:
 $\emptyset \subseteq A$ and $A \subseteq A$.
 - Find all the subsets of $\{1,2,3,\{1,2\}\}$.

- Draw a Venn diagram to illustrate the fact that $A \cup B \subseteq C$.
- Find the domain and range of the relation $\{(x, y) \in \mathbb{R}^2 : y = |x|\}$.
- What is a Poset? Give an example.

2. Answer any **two** questions: 5×2=10

- Prove or disprove that $(\sim(pq))$ is logically equivalent to $((\sim p)(\sim q))$. 5
- If $A \Delta B = A \Delta C$ then show that $B = C$. 5
- A relation R is defined on the set \mathbb{Z} by “ aRb if and only if $a-b$ is divisible by 3” for $ab \in \mathbb{Z}$. Verify whether R is an equivalence relation. 5
- Prove that $A \subseteq B$ if and only if $\wp(A) \subseteq \wp(B)$. 5

3. Answer any **two** questions: 10×2=20

- Assuming the truth value of $p \vee q$ be T , construct the truth table of $\sim p \vee q \leftrightarrow p \vee q$.
 - Negate the following statement and put the answer in positive form:
 $(\forall x \in \mathbb{N})(\exists y \in \mathbb{N})(x + y = 1)$. 5+5
- Let R be an equivalence relation on a set S and $a, b \in S$. Prove that the equivalence

classes $cl(a)$ and $cl(b)$ are either equal or disjoint.

- ii) Let (S, \leq) be a poset. Define a relation \geq on S by “ $a \geq b$ if and only if $a \leq b$ ”, for $a, b \in S$. Show that (S, \geq) is a poset.

5+5

- c) For any three sets A, B and C , prove the following relations:

i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

5+5

OPTION- B
MATH(G)SEC-T-1B
(Computer Graphics)

GROUP-A

1. Answer any **five** questions: 2×5=10
- a) What are morphing and tweening?
 - b) What is dithering?
 - c) What do you mean by interlacing?
 - d) What is flickering? Why does it happen?
 - e) What is rasterization?
 - f) What do you mean by aspect ratio?
 - g) What is the need for a graphics device driver?
 - h) A system having 8 M bytes of video memory for bit-mapped graphics with 64-bit colour. What is the maximum resolution it can support?

GROUP-B

2. Answer any **two** questions : 5×2=10
- a) i) Write down the differences between emissive and non-emissive displays.
 - ii) What is the role of a video controller?

3+2

- b) Write down the differences between Digital Difference Analyzer (DDA) algorithm and Bresenham's line drawing algorithm. 5
- c) i) What do you mean by interactive computer graphics?
- ii) Explain the role of pixel and frame buffer in graphics devices. 2+3
- d) i) Define Window and view-port.
- ii) Write the differences between window-port and view-port. 2+3

GROUP-C

3. Answer any **two** questions: 10×2=20
- a) i) What do you mean by retracing? Define horizontal and vertical retracing.
 - ii) Explain polygon filling algorithm with a suitable example. 3+7
 - b) i) What is a winding number?
 - ii) List the areas of applications of computer graphics.
 - ii) Explain arc generation technique using DDA algorithm. 1+2+7

- c) i) What is a beam penetration method?
- ii) Define shadow masking.
- iii) Discuss ellipse generating algorithms. 2+2+6
- d) Define the following terms:
 - i) aliasing and anti-aliasing,
 - ii) pixel phasing and scaling,
 - iii) translation and rotation,
 - iv) shearing and reflection,
 - v) clipping and covering (exterior clipping). 2+2+2+2+2