U.G. 3rd Semester Examination - 2020

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

   a) What do you mean by proposition? Give an example.

   b) Write the negation of the statement-"If it is raining, you take your umbrella".

   c) Translate the propositional form $q \leftrightarrow \neg r$ into statement.

   d) Find all the subsets of the set {Math, English, History}.

   e) Draw Venn diagrams to represent $A \cup B$ & $A \cap B$.

   f) Define cartesian product of two sets with an example.

   g) Find the domain and range of the relation R = {(0, 1), (2, 3), (4, 5), (6, 7)}.

   h) Define partially ordered set (or poset) with an example.

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

   a) Show that $\neg(p \vee q) \Leftrightarrow \neg p \wedge \neg q$. 5

   b) If $A \cap B = A \cap C$ and $A \cup B = A \cup C$, then prove that $A = B$. 5

   c) Define power set of a set. Find the power set of the following sets:

      i) $\{\Phi, \{\Phi\}\}$

      ii) $\{\Phi, a\}$. 1+2+2

   d) Define an equivalence relation on a set A. Give an example of a relation which is reflexive and transitive but not symmetric. 2+3

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

   a) i) What do you mean by the truth-table of a statement? Assuming the truth-value of $p \leftrightarrow q$ be T, construct a truth table of $\neg p \rightarrow \neg q$ & $\neg q \rightarrow p$.

ii) Show that $p \vee (q \wedge \neg p)$ and $(p \vee q) \wedge \neg p$ are not logically equivalent. 5+5

b) i) Define symmetric difference. If A and B are two sets, then prove that $A \Delta B = B \Delta A$.

ii) Let A and B be finite sets. Prove that $|A \cup B| = |A| + |B| - |A \cap B|$. 5+5

c) i) For all $a, b \in \mathbb{R} \setminus \{0\}$, let aRb if and only if $ab > 0$. Show that R is an equivalence relation on $\mathbb{R} \setminus \{0\}$.

ii) Find the equivalence classes [1] and [-3]. 5+5

OPTION- B

MATH(G)SEC-T-1B

(Computer Graphics)

1. Answer any **five** questions: 3×5=15

a) What are the differences between raster scan systems and random scan systems?

b) What do you mean by anti-aliasing?

c) Lists various applications of computer graphics.

d) What do you mean by scan conversions?

e) Explain the role of pixel and frame buffer in graphics devices.

f) How world coordinate system is converted to screen coordinate system?

g) What is the meaning of aspect ratio? What is the need for a graphics device driver?

2. Answer any **five** questions: 5×5=25

a) What is color CRT display? Write down the major components of a CRT device.

b) Explain about different line drawing algorithms.

c) Discuss ellipse generating algorithms.

d) Compare the computation done in Digital Difference Analyzer (DDA) algorithm with Bresenham's line drawing algorithm.

e) What is the concept of a vanishing point? What is text clipping?

f) Explain polygon filling algorithm with a suitable example.

g) What is linear transformation? Write down the main components of a display processor.

———————————