## Sample Paper 2021Section A

**Date: 4/5/2021**

**Time - From: 10:00 To: 13:00**

**Instructions to candidates:**

# Section A

Ten short questions. Answer ALL questions. Each question carries equal marks.

40 marks each

# Section B

Two structured questions. Candidates are required to answer both questions.

200 marks

# Section C

Two structured questions. Candidates are required to answer both questions.

200 marks

**Percentage: 40%**

**Module Code: C20139**

**Module: Mathematics**

*Candidates are required to answer any 10 of the following 10 short questions. Each question carries equal marks.*

**Question 1**

Graph the inequality y ≤ 5x - 1

**Question 2**

Solve for x 1 3 1

=

x – 3 x – 4 2

–

**Question 3**

Solve for x 5x2 +7x – 3 = 0

**Question 4**

Write 5 in the form a + bi

1 – 2i

**Question 5**

Differentiate 3x2 – 2

5x + 1

**Question 6**

Calculate the sin 15o without using a calculator (you may use log tables). Give your answer as a fraction.

# Question 7

In a room there are 20 people, 5 of whom wear glasses. If two people leave the room one after the other, what is the probability that both people do not wear glasses?

**Question 8**

∫

0

2

(3x2 – 2)dx

# Question 9

п

Find the period and range of f(x) = 6 – cos(3x – 2 ).

**Question 10**

Express the complex number  polar form.

Section B



|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | **(a)** | VAT is charged at a rate of 21% on garden furniture items. |  |
|  |  |  |  |
|  | (i) | Devise a model to express the total cost of purchasing one garden furniture item including the VAT. |  |
|  | (ii) | Use your model to calculate the total cost including VAT of purchasing an item with a price tag of €400. Give your answer correct to two decimal places. |  |
|  |  |  |  |
|  | **(b)** | Draw a graph of  in the domain |  |
|  |  |  |  |
|  |  | Use the graph to write down the following |  |
|  |  |  |  |
|  | (i) | Roots of the equation . |  |
|  | (ii) | Find the coordinates of the local minimum point. |  |
|  | (iii) | Find the coordinates of the local maximum point. |  |
|  | (iv) | Range of values of x for in the given domain. |  |
|  | (v) | Range of values of x where is increasing. |  |
|  |  |  |  |
| **2** | (a) | Explain each of the following in your own words: |  |
|  | (i) | Mode / Median / Mean / Standard Deviation |  |
|  |  |  |  |
|  | (b) | Calculate the mean and standard deviation of the following: |  |
|  |  | |  |  |  |  | | --- | --- | --- | --- | | Time (in minutes) | 2 - 4 | 4 - 6 | 6 - 10 | | No. of students | 3 | 5 | 7 | |  |
|  |  |  |  |
|  | (c) | Patricia asks some people in her town about their dietary habits and records the results in the table below.  relative frequency table example  a) Work out the relative frequency of someone in Patricia’s town being vegetarian.  b) There are 20,0000 people in Patricia’s town. Using your answer to part a), find an estimate for the number of people in this town who are vegetarian. |  |
|  |  |  |  |
|  | (d) | A box contains tickets numbered 1 to 12. An event consists of picking at random a ticket from the box and throwing a die.   1. Find the probability of getting 3 on the ticket and 6 on the die. 2. Find the probability of getting the same number on the ticket and on the die.   Section C |  |
|  |  |  |  |
| **3** | (a) | Differentiate the following:- |  |
|  | (i) | (x6 – 3x)(x2 – 9x) |  |
|  | (ii) | If , then find the value of the derivative when x = 1. |  |
|  | (iii) | Find the value of *a* if the slope of the tangent to the curve y = x2 + ax at the point where x = –1 is 3. |  |
|  | (b) | Evaluate the following: |  |
|  | (c) | Find the length of side c as seen in the triangle below. Find the area of the triangle. |  |
|  |  |  |  |
| **4** | (a) | Plot 3-3i on an Argand diagram |  |
|  |  |  |  |
|  | (b) | Write in the form a+bi |  |
|  |  |  |  |
|  | (c) | Solve the following equation:  = 0 |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |