

ACADEMIC YEAR 2023 – 2024

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|-------------------|-------------|-----------------|---------------|
| Program | Term | Semester | Paper |
| FOUNDATION | 1 | 2 | MAIN 1 |

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| MODULE NAME: | APPLIED MATHEMATICS |
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| MODULE CODE: | FMTH006 | EXAM DATE: | 29/4/2024 |
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| TEACHER'S NAME: | KHALOUD AL AJMI | DURATION: | 2 hrs. |
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| Questions to be answered on: | Allowed requirements | Number of pages |
|--------------------------------------|----------------------------------|------------------------|
| Space provided on the question paper | Pen Pencil (only for drawing) | (Incl. Cover Page): 08 |

Points of Attention:

- For each question, the maximum earned points are mentioned between brackets at the end of each question.
- Write very clearly! Answers that are not readable are not marked and don't get points!
- Make sure your answers are written to the point.
- All answers must be written **in English**.
- Write all the answers **in blue or black pen only**.
- When finished, submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Any cheating/copying may fail the examination.

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|---|--------------------|
| STUDENT NAME: <input style="width: 90%;" type="text"/> | FINAL MARKS |
| STUDENT ID: <input style="width: 90%;" type="text"/> | 40 |
| CLASS: <input style="width: 90%;" type="text"/> | |

Number of answer scripts:

Invigilator:

Student's signature:

Time of receipt:

Question 1

[6 Marks]

The table shows the number of male and female students enrolled in nursing at the University Health center for a recent semester:

| | Nursing majors | Non-nursing majors | Total |
|---------|----------------|--------------------|-------|
| Males | 151 | 1104 | 1255 |
| Females | 1016 | 1693 | 2709 |
| Total | 1167 | 2797 | 3964 |

If a student is selected at random, find the probability that,

a) The student is male or a non nursing major student. (3 marks)

b) The student is female or a nursing major student. (3 marks)

Question 2

[5 Marks]

Let $f(x) = x^2 + 7$ and $g(x) = 2x + 1$

a. Calculate $f \circ g$.

(3 marks)

b. Calculate $g \circ g$.

(2 marks)

Question 3

[5 Marks]

The sum of two numbers is twice their difference. The larger number is 6 more than twice the smaller. Find the numbers.

Question 4

[7 Marks]

If a task is learned at a performance level P_0 , then after a time interval t the performance level P satisfies $\log P = \log P_0 - c \log(t + 1)$, where c is a constant that depends on the type of task and t is measured in months.

a. Solve for P .

(4 marks)

b. Use the Law of Forgetting to estimate a student's score on a biology test two years after he got a score of 80 on a test covering the same material. Assume that $c = 0.3$ and t is measured in months.

(3 marks)

Question 5

[6 Marks]

Find the maximum or minimum value of the function given below.

a. $f(t) = -3 + 80t - 20t^2$

(3 marks)

b. $f(x) = -1500x + 100x^2$

(3 marks)

Question 6

v [6 Marks]

If the number of weeks it took to reach a target weight for a sample of 10 patients with eating disorder are:

2.5 10.5 17.5 16.5 13.0 16.5 26.5 2.5 28.5 10.5

Calculate the mean, median and mode for the data.

Question 7

[5 Marks]

Find the solution of the exponential equation.

a. $5^{2x-3} = 1$

(2 marks)

b. $2e^{12x} = 17$

(3 marks)

References:

Larson, R. and Hostetler, R. (2007) *Precalculus*. 7th edn. Boston: Houghton Mifflin Company.

Stewart, J., Redlin, L. and Watson, S. (2017) *Precalculus Mathematics for Calculus*. 7th edn. Cengage.