الجامعة الوطنية
National University
Science & Technology للعلوم والتكنولوجيا
كلية عمان البحرية الدولية
International Maritime College Oman

ACADEMIC YEAR 2023 - 2024

Program	Term	Semester	Paper
FOUNDATION	2	FALL	MAIN

MODULE NAME:	**APPLIED MATHEMATICS**		
MODULE CODE:	**FMTH006**	**EXAM DATE:**	**04/02/2024**
INSTRUCTOR's NAME:	**Muhammad Javed**	**DURATION:**	**2 hrs.**

Questions to be answered on:	**Allowed tools:**	**Number of pages**
✓ Space provided on the question paper	Pen, Pencil & Calculator	(Incl. cover page)**: 9**

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 should be written **in English.**
- Write all the answers in **blue or black pen only.**
- Use the **pencil** only for **diagrams & graphs.**
- Show all the calculation steps in the given space.
- When finished submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Any cheating/copying may result in an instant failing of the examination.

STUDENT NAME:

STUDENT ID:

FINAL MARKS

	40
	10

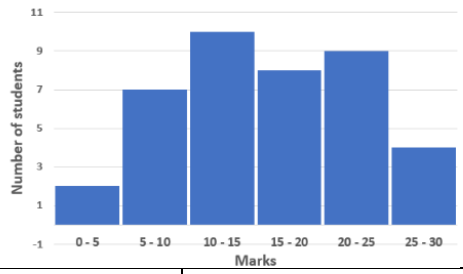
Number of answer scripts:…….……. **Invigilator:**…….……

Student's signature: …… **Time of receipt:**……..….

Note: Answer all questions

Question 1. **[10 Marks]**

Encircle the correct option.

1.	If $g(x) = \frac{1-x}{1+x}$, then find the value of $g(-1)$.			
	a. 1	b. -1	c. 0	d. Not defined
2.	Evaluate $\log_6 36$.			
	a. 6	b. 3	c. 2	d. 9
3.	Which of the following values do not represent probability of an event?			
	a. 0	b. 0.5	c. 1	d. 1.5
4.	Determine median of the following data. 38 39 41 42 44 44			
	a. 41	b. 42	c. 44	d. Non of them
5.	Given the histogram of marks obtained by students in a mathematics test out of a total of 30. How many students took the test? 			
	a. 10	b. 20	c. 30	d. 40
6.	If $f(x) = \frac{1}{2}x^2 + 2x - 6$ is the equation of parabola, determine its opening dimension.			
	a. Up	b. Down	c. Left	d. Right
7.	What is the logarithmic form of 64?			
	a. $\log_4 64 = 2$	b. $\log_2 64 = 4$	c. $\log_8 64 = 2$	d. $\log_4 64 = 8$
8.	Find the sample space if a die is rolled once.			
	a. $\{0,1,2,3,4,5,6\}$	b. $\{1,2,3,4,5,6\}$	c. $\{0,1,2,3,4,5,6,7\}$	d. $\{1,2,3,4,5,6,7\}$
9.	Find the amount to be paid back on a loan of OMR 10000 at a simple interest rate of 5.0% per annum for 2 years.			
	a. OMR. 1000	b. OMR. 10000	c. OMR. 10050	d. OMR. 10500
10.	Which of the below options is true for the solution of the following system of equations? $2x - 3y = 12\ ;\ -x + \frac{3}{2}y = 4$			
	a. Infinitely many solutions	b. Unique	c. No solution	d. Complex

Question 2. **[5 Marks]**

Assume the following is the weekly fuel consumption cost set in OMR of 30 same-nature vehicles in a company.

72	84	61	76	104	76	86	92	80	88
98	76	97	82	84	67	70	81	82	89
74	73	86	81	85	78	82	80	91	83

Construct a frequency distribution for the given data set using 8 number of classes.

Question 3. **[5 Marks]**

Answer the following questions if two coins are tossed together.

a. Draw the tree diagram for the experiment. (1 mark)

b. List all the elements of sample space. (1 mark)

c. Determine the event and probability: (3 marks)

i. For getting at least one tail.

ii. For at most one tail and then find the probability.

Question 4. **[5 Marks]**

The Times of Oman regularly reports the air quality index for various areas across the country. A sample of air quality index values for a region is provided in the following data. Compute the sample variance.

28 42 58 48 45 55 60 49 50

Question 5. **[5 Marks]**

A fruit stand sells two varieties of strawberries: standard and deluxe. A box of standard strawberries is sold for $7, and a box of deluxe strawberries is sold for $10. In one day the stand sold 135 boxes of strawberries for a total of $1110. How many boxes of each type were sold?

Question 6. **[5 Marks]**

Graph the solution set of the system of inequalities. Find the coordinates of all vertices, label the vertices and determine whether the solution set is bounded.

$y \leq -2x + 8$; $y \leq -\frac{1}{2}x + 5$; $x \geq 0$; $y \geq 0$

Question 7. **[5 Marks]**

A sum of $ 2000 is invested at an interest rate of 10% per year. Find the amounts in the account after 3 years if the interest is compounded monthly and annually.

Laws and formulas

1. $\log_a xy = \log_a x + \log_a y$
2. $\log_a \frac{x}{y} = \log_a x - \log_a y$
3. $\log_a x^n = n\log_a x$
4. $\log_a b = \frac{\log_c b}{\log_c a}$
5. $\log_a b = \frac{1}{\log_b a}$
6. $\frac{1}{n-1}\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]$
7. $\sqrt{\frac{1}{n-1}\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]}$