

P425/2

APPLIED MATHEMATICS

Paper 2

July 2023

3hours

NAMPUNGE COMMUNITY HIGH SCHOOL

S5 MID TERM TWO EXAMS 2023

INSTRUCTIONS

Attempt all the questions in this paper

Assume where necessary $g = 9.8ms^{-1}$

SECTION A

1. Two events A and B are such that $P(A) = 0.2$, $P(A \cap B) = 0.22$ and $P(A \cup B) = 0.18$. Find $P(B)$ and $P(A/B)$
2. Find the maximum absolute error in $\frac{\sqrt{A}}{B^2 C^3}$ Given that $A = 2.8, B = 6.4$ and $C = 3.4$ all rounded off
3. Forces of magnitude 6N and 5N act on a body. If their resultant is has a magnitude of 9N. find the angle between the forces hence direction of the resultant.
4. The table below shows variation of t and the corresponding values of $g(t)$

t	15	30	45	60
$g(t)$	1.8148	3.1624	5.0964	7.3456

Use linear interpolation and extrapolation to solve for

- (i) $y = 2.5t$ when $g(t) = 6.382$
 - (ii) $g(39.5)$
5. Forces F_1 and F_2 of magnitudes 4N and 6N respectively act on a body in the directions of $4i+3j$ and $6i-2j$ respectively. Find the magnitude and the direction of the resultant force
 6. Two fair dice are tossed together and the heads that shows up are noted. Find the probability of showing same numbers up
 7. The following numbers are values obtained from an experiment 2,3,4,5,3,2,8,6. Find the semi inter-quartile range

8. Forces of magnitudes 4N,5N,3N and 3N act on a square along AB,CB,CD and BD respectively with the directions of the forces indicated by the order of letters. If AB is horizontal, find the magnitude and direction of the resultant force.

SECTION B

9. The times taken by a group of students to solve a mathematical problem are given below

Time	<5	<9	<14	<19	<24	<29	<34
No. students	0	5	14	30	17	11	3

- (a) Draw a histogram to estimate the modal mark for the data
 (b) Calculate the mean time and the standard deviation (12 marks)
10. Abel,Bob and Charles applied for the same job in the same company. The probability that Abel will take the job is 0.75 and Bob getting the job is 0.5 and Charles not getting the job is 0.3. what is the probability that;
- (i) None of them will take the job (6 marks)
- (b) Two events A and B are independent. Given that $P(A \cap B) = \frac{1}{4}$ and $P(A^c / B) = \frac{1}{6}$
 find $P(A)$ and $P(B)$ (6 marks)
11. ABCDEF is a regular hexagon of side 2m. forces of magnitudes 4N,5N,3N,3N,8N and 4N act along the sides AB,BC,AC,CD,EF and FA respectively the direction of the forces indicated by the order of the letters. Find the magnitude and the direction of the resultant force and length AE if AB is horizontal (12 marks)
12. (a) Show that the maximum relative error in approximating $x\sqrt{y}$ is $\left(\frac{\Delta x}{x} + \frac{\Delta y}{2y}\right)$ if an error of Δx and Δy occurred in x and y respectively. (6marks)
- (b) Given that 2.14 and 3.6 are dimensions of a rectangle , find the limit within which the exact value of the area of the rectangle would lie (6marks)
13. In a certain commercial institution, a speed and error examination was administered to 10 randomly selected candidates A,B,.....J. the table below shows their speed and errors committed

Errors(x)	12	24	20	10	32	30	28	15	18	40
Speed (y)	130	136	124	120	153	160	155	142	145	172

- (a) By awarding first rank to the candidate with least errors and first rank to the fastest candidate, calculate the rank correlation co efficient for the data (6marks)
- (b) Plot the given data on a scatter diagram and draw the line of the best fit to estimate the number of errors committed by a candidate whose speed is 140 seconds (6 marks)

THE END