

STUDENT NAME: \_\_\_\_\_ SCHOOL: \_\_\_\_\_

2025

M132/II



# SOUTH WEST EDUCATION DIVISION

MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

## ADDITIONAL MATHEMATICS

Monday, 14 April

Subject Number: 132/II

Time allowed: 2 hours

(10:00am-12:30 pm)

### PAPER II (100 marks)

#### Instructions

1. This paper contains 16 pages. Please check.
2. Answer **all** the **seven** questions in **Section A** and any **two** questions from **Section B**
3. Section A carries 60 marks and Section B carries 40 marks
4. All answers should be written in the spaces provided after every question
5. Calculators may be used
6. **All necessary working should be shown** and any numerical expression being evaluated by calculators or mathematical tables must be clearly stated; otherwise marks for method may be lost
7. The final answer to a question requiring use of a table or a calculator should normally be given to three significant figures
8. Write your **Name** and the **name of your school** on top of each page of our question paper
9. In the table provided on this page, tick against the question number you have answered.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Total			

Answer **all** the **seven** questions in this section in the spaces provided.

1. a. Given that  $P(A) = 0.4$ ,  $P(B) = 0.2$  and  $P(A \text{ and } B) = 0.08$ . With reasons, determine whether events A and B are independent. **(4 marks)**

- b. Given that  $\underline{a} = 5\mathbf{i} + \mathbf{j}$  and  $\underline{b} = -2\mathbf{i} - 4\mathbf{j}$ , find the value of  $|2\underline{a} + \underline{b}|$ . **(5 marks)**

Continued/...

2. a. A particle of mass 3kg is acted on by forces  $F_1$  and  $F_2$ .

Given that  $F_2 = (7\mathbf{i} - 3\mathbf{j} + \mathbf{k})$  and that the particle accelerates at

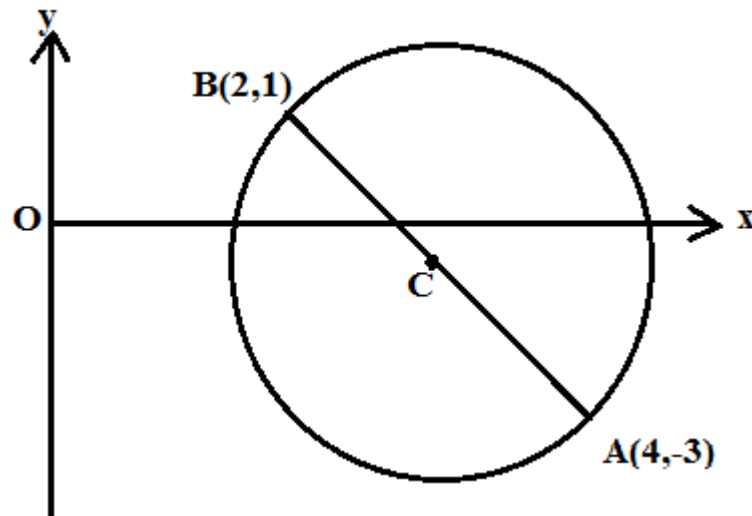
$(2\mathbf{i} - \mathbf{k})\text{m/s}^2$ , find  $F_1$  giving the answer in the form  $(p\mathbf{i} + q\mathbf{j} + r\mathbf{k})\text{N}$ .

(5 marks)

- b. Given that  $\sum_{n=1}^k (8 + 3n) = 377$ . If  $k > 0$ , find the value of k. (5 marks)

Continued/...

3. a. **Figure 1** shows a circle on the cartesian plain with AB as diameter and C is the center of the circle.



**Figure 1**

Find the equation of the circle in an expanded form.

**(6 marks)**

Continued/...

STUDENT NAME: \_\_\_\_\_ SCHOOL: \_\_\_\_\_

2025

Page 5 of 16

M132/II

b. There are 20 bolts manufactured by a certain company. If 10% of them are defective, calculate the probability that at least 17 of them are good.

(5 marks)

Continued/...

4. Given that  $A = \begin{bmatrix} p & q \\ 2p & 3q \end{bmatrix}$  and  $B = \begin{bmatrix} p & 2q \\ 2p & q \end{bmatrix}$ , where p and q are non-zero constants. If  $XA = B$ , find matrix X. (6 marks)

5. The sum of an Arithmetic Progression (AP) is given by

$$S_n = \sum_{r=1}^n a + (r-1)d. \text{ If } \sum_{r=1}^{10} a + (r-1)d = \sum_{r=11}^{14} a + (r-1)d.$$

Show that  $d = 6a$ .

**(6 marks)**

6. a. Given  $\underline{a} = 5t\underline{i} + 2t\underline{j} + t\underline{k}$ . If  $|\underline{a}| = 3\sqrt{10}$ , find the possible values of t

(5 marks)

- b. Find the interquartile range for the following set of data:

7, 0, 5, 1, 6, 8, 12, 6, 3, 15, 11 and 4.

( 4marks)

Continued/...



STUDENT NAME: \_\_\_\_\_ SCHOOL: \_\_\_\_\_

2025

Page 9 of 16

M132/II

7. Find the length of the tangent drawn from A (4, 5) to the point of contact with the circle  $x^2 + y^2 - 6x + 10y + 14 = 0$ . (8 marks)

Continued/...

Answer any **two** questions from this section in the spaces provided.

8. a. **Table 1** shows marks of student recorded in grades and their frequencies.

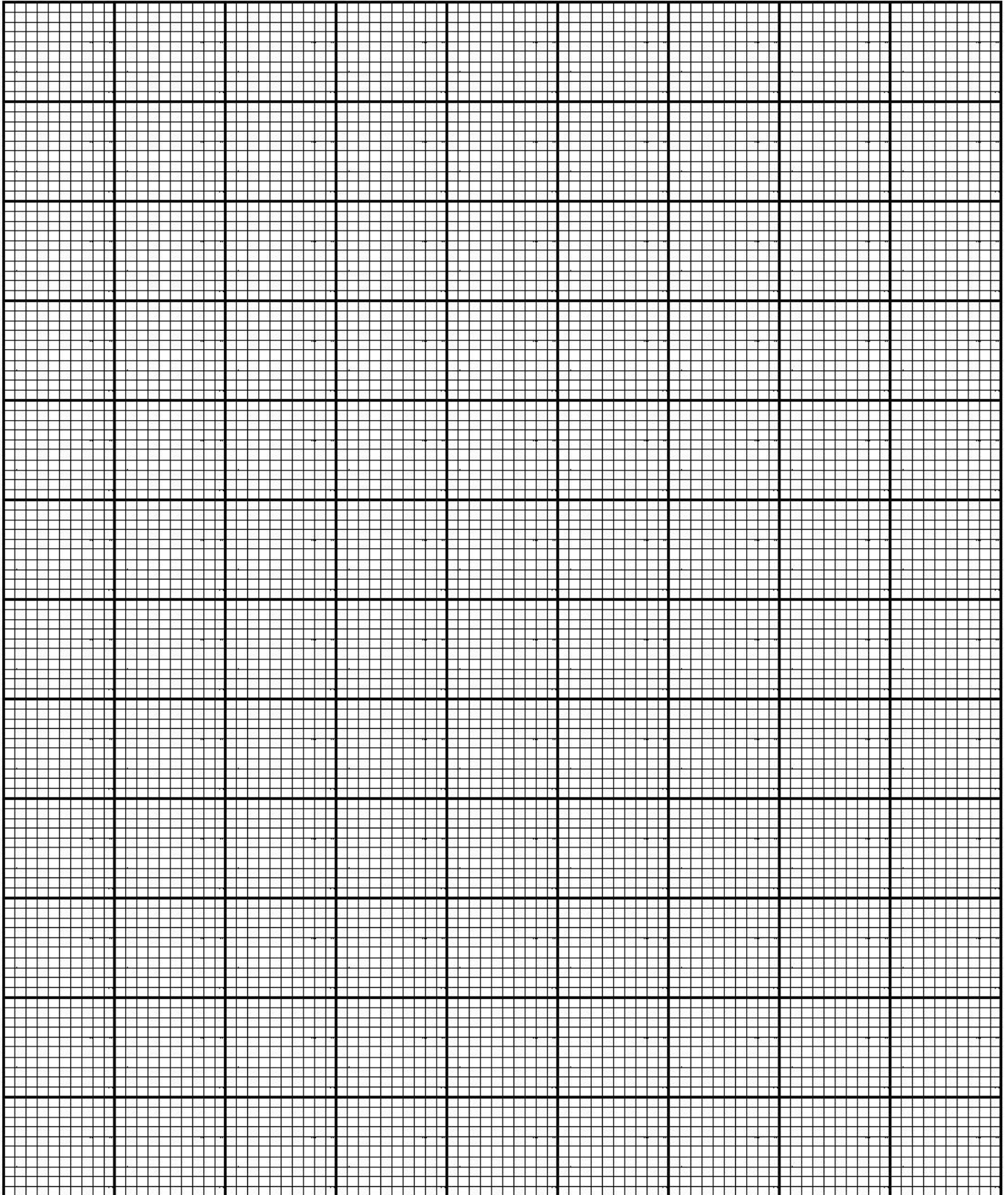
**Table 1**

Marks %	Grade	Frequency
$\leq 30$	E	30
31-44	D	14
45-64	C	20
65-84	B	20
85-100	A	16

- (i) Draw a histogram to represent this information on the graph paper provided on **page 11**. **(7 marks)**

- (ii) Use the histogram to estimate the number of candidates whose passes are in the range of 37%-50%. **(3 marks)**

Continued/...



Continued/...

## 8 (Continued)

b. A missile is projected from point O on the horizontal ground with

a speed of 24m/s for 2 seconds at an angle  $\theta$  where  $\tan\theta = \frac{12}{5}$ .

Calculate the magnitude and direction of the velocity of the missile.

(Assume  $g = 10$ )

**(10 marks)**

Continued/...

9. a. Given that the lines  $L_1$  and  $L_2$  with the following vector equations:

$$L_1 = \begin{pmatrix} 3 \\ 8 \\ -2 \end{pmatrix} + t \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} \text{ and } L_2 = \begin{pmatrix} 7 \\ 4 \\ 3 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ 1 \\ 4 \end{pmatrix} \text{ intersect at point P.}$$

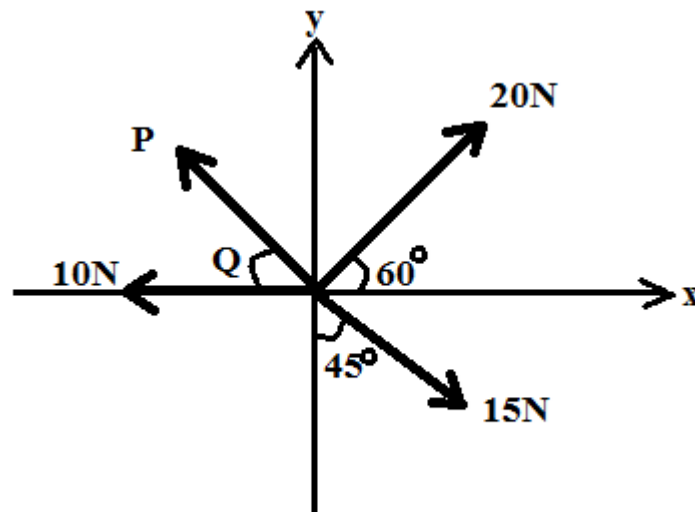
Calculate the position vector of P.

**(10 marks)**

Continued/...

9. (Continued)

b. **Figure 2** shows four forces acting on an object which are in equilibrium.

**Fig 2**

Calculate the values of **P** and **Q**.

**(10 marks)**

Continued/...

10. a. Given  $S = \{a: a \text{ is a natural number less than } 20\}$ .

Let A be set of **even** numbers and B set of numbers **more than 15**.

If A and B are **independent** events, solve for P(X) given that

$$P(A/B) = P(X) + P(B/A) \quad (10 \text{ marks})$$

STUDENT NAME: \_\_\_\_\_ SCHOOL: \_\_\_\_\_

2025

Page 16 of 16

M132/II

- b. A circle passing through  $A(-2, -3)$ ,  $B(0, -1)$  and  $C(2, -3)$  has center O.

Find the coordinates of the centre of the circle

(10 marks)

**END OF THE QUESTION PAPER**

**NB: This paper contains 16 printed pages.**