FURTHER MATHEMATICS/MATHEMATICS (ELECTIVE)

EXAMINATION SCHEME

There will be two papers, Papers 1 and 2, both of which must be taken.

PAPER 1: will consist of forty multiple-choice objective questions, covering the entire syllabus. Candidates will be required to answer all questions in $1\frac{1}{2}$ hours for 40 marks. The questions will be drawn from the sections of the syllabus as follows:

Pure Mathematics	-	30 questions
Statistics and probability	-	4 questions
Vectors and Mechanics	-	6 questions

PAPER 2: will consist of two sections, Sections A and B, to be answered in $2\frac{1}{2}$ hours for 100 marks.

Section A will consist of eight compulsory questions that are elementary in type for 48 marks. The questions shall be distributed as follows:

Pure Mathematics	-	4 questions
Statistics and Probability	-	2 questions
Vectors and Mechanics	-	2 questions

Section B will consist of seven questions of greater length and difficulty put into three parts: Parts I, II and III as follows:

Part I:	Pure Mathematics	-	3 questions
Part II:	Statistics and Probability	-	2 questions
Part III:	Vectors and Mechanics	-	2 questions

Candidates will be required to answer four questions with at least one from each part for 52 marks.

SAMPLE QUESTIONS

PAPER 1
(OBJECTIVES)

1. Find the equation of the line joining points (8, 1) and (-3, 4).
   A. $3x - 11y - 35 = 0$
   B. $3x - 11y + 35 = 0$
   C. $3x + 11y - 35 = 0$
   D. $3x + 11y + 35 = 0$

2. The sum of the first and sixth terms of an Arithmetic progression (A.P.) is 21. If the first term is 3, find the eighth term.
   A. 24
   B. 27
   C. 30
   D. 33

3. If α and β are the roots of the equation $2x^2 - 5x + m = 0$, where m is a constant, find $(\alpha^2 + \beta^2)$ in terms of m.
   A. $\frac{25}{4} + 2m$
   B. $\frac{25}{4} + m$
   C. $\frac{25}{4} - 2m$
   D. $\frac{25}{4} - m$

4. Given that $y = \cos^2 x$, find $\frac{dy}{dx}$.
   A. $-\sin^2 x$
   B. $-\cos x \sin x$
   C. $-2\cos x \sin x$
   D. $-2\sin^2 x$

5. The position vectors of points P, Q and R are $\mathbf{p} = 4\boldsymbol{j}$, $\mathbf{q} = (4\boldsymbol{i} + 10\boldsymbol{j})$ and $\mathbf{r} = (k\boldsymbol{i} + 8\boldsymbol{j})$ respectively, where k is a constant. If $\angle PQR = 90^{o}$, find the value of k.
   A. 7
   B. 1
   C. -1
   D. -7

PAPER 2
(ESSAY)

SECTION A

1. Given that * is a binary operation defined on R, the set of real numbers by $x*y = \frac{x^2}{x+y}$, where x, y $\in$ R.
   (a) evaluate (2 * 3) * 5.
   (b) If (x + 1) * (x + 2) = $\frac{1}{3}$, find the value of x.

2. The marks scored by forty candidates in an examination are shown in the table.

Marks	1	2	3	4	5	6	7	8	9
Number of candidates	2	3	m	8	10	5	3	3	n

   If the mean of the distribution is 4.725, find the values of m and n.

SECTION B

Part I
(Pure Mathematics)

3. Use the trapezium rule, with ordinates at x = 1, 2, 3, 4 and 5, to calculate, correct to two decimal places, an approximate value for

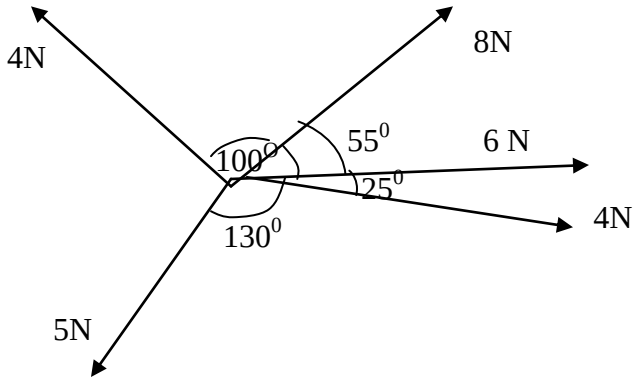
$\int_1^5 (2x + 8x^{-2})\, dx$.

Part II
(Statistics and Probability)

4. The deviations from 10 of a given set of numbers are 2, 1, 0, -4, -5, - 1, - 2 and – 7. Find the:
   (i) mean;
   (ii) median;
   (iii) standard deviation of the numbers.

Part III
Vectors and Mechanics

5.



Coplanar forces 4N, 8N, 6N, 4N and 5N act at a point as shown in the diagram. If the 6N force act in the direction 090°, calculate the magnitude of the resultant force.