SCACO

S5 End of Term I Examinations 2023

P425/2: Applied Mathematics

Paper 2 **Duration**: 2 Hours and 30 Minutes

INSTRUCTIONS

Answer **ALL** *questions in this paper*

Silent, non-programmable scientific calculators and mathematical tables may be used.

SECTION A

1. The mean heigh of 10 boys is 9.6cm. if they are 0.9, x, 11, 6, 10, 12, 8, 9, 12 and 9.
   i) Find the value of x.
   ii) Calculate the median (05marks)
2. A sample consists of 8 members; 2, 0, 3, 1, 6, 4, 5 and 3. Find the
   i) Mean
   ii) Standard deviation of the sample (05marks)
3. If a = $i - 3j + 2k$, $b = 5i + 4j$ and $c = 3i + j + 4k$. Find $|a + b + c|$ (05marks)
4. Two unbiased coins are tossed 3 times, using
   $H_1 for\ coin\ 1\ showing\ head, H_2 for\ coin\ 2\ showing\ head, T_1\ for\ coin\ 1\ showing\ tail, T_2$
   for coin 2 showing tail. Construct all sample spaces generated in the experiment and find the probability of obtaining exactly 2 heads (05marks)
5. A body moves along a straight line from A to B with uniform acceleration $\frac{2}{3}ms^{-2}$. The time taken is 12 second and the velocity at B is $25ms^{-1}$. Find
   a) The velocity at A
   b) The distance AB (05marks)
6. A man walks 400m due east in 190s and then 100m due west in a time of 40s. calculate
   a) His average speed
   b) His average velocity for the whole journey (05marks)
7. A particle has an initial position vector $(3i + 2j + 4k)m$. If the particle moves with a constant velocity of $(5i + j - 3k)ms^{-1}$. Find
   a) The position vector of the particle after time t
   b) The position vector of particle after 10 seconds (05marks)

SECTION B

8. A lorry starts from a point A and moves along a straight horizontal road with constant acceleration of $2ms^{-2}$. At the same time, a car moving with a speed of $20ms^{-1}$ and a constant acceleration of $3ms^{-2}$ is 400m behind the point A and moving in the same direction as the lorry. Find
   a) How far from A the car overtakes the lorry?
   b) The speed of the lorry when it's being overtaken

9. A train starts from station A with a uniform acceleration of $0.2ms^{-2}$ for 2 minutes and attains a maximum speed and moves uniformly for 15 minutes. It is then brought to rest at constant retardation of $\frac{5}{3}ms^{-2}$ at station B.
   a) Sketch the velocity time graph for the train.
   b) Find the time taken for the whole journey.
   c) Find the distance traveled by the train.
10. The times taken for S5 students to have their lunch to the nearest minute are given in the table below

Time (minutes)	15-19	20-24	25-29	30-34	35-39
No. of students	2	7	16	21	9

   a) Calculate the mean time for the students to have lunch
   b) I) Draw a histogram for the given data
      II) Use your histogram to estimate the modal time for the students to have lunch

END