UGANDA ADVANCED CERTIFICATE OF EDUCATION
S.5 APPLIED MATHEMATICS P425/2
TIME: 2½HOURS

Answer all questions in this paper

1. The sum of squares of 50 lengths measured to the nearest m is 40,000m^2 and the square of their sum is 150,000m^2. Find the mean length and the standard deviation. (**5marks**)
2. Forces **P** and **R** of magnitudes 30N and 78N act in the directions of the unit vectors $\frac{4}{5}\boldsymbol{i} - \frac{3}{5}\boldsymbol{j}$ and $\frac{1}{13}(12\boldsymbol{i} - 5\boldsymbol{j})$ respectively. Find their resultant force. (**5marks**)
3. A bag contains 5 yellow, 4 black and 8 red cards. If three cards are picked at random, one after the other without replacement, find the probability that:
   a. all are of different colours (**2marks**)
   b. all the 3 cards are of the same colour (**3marks**)
4. Find the magnitude and direction of the resultant of the velocities $15ms^{-1}$ and $25ms^{-1}$ which are inclined at an angle 60^0 to each other. (**5marks**)
5. A discrete random variable X has a pdf defined by $2P(X=3) = 3P(X=0) = \frac{1}{2}P(X=1) = \frac{1}{2}P(X=2)$, if the $P(X=1) = 6k$, find the value of k and the expected value of X. (**5marks**)
6. The resultant of the forces $\begin{pmatrix} c+1 \\ 2 \end{pmatrix}N$, $\begin{pmatrix} -3 \\ 2c \end{pmatrix}N$, $\begin{pmatrix} 1-2c \\ 5 \end{pmatrix}N$ and $\begin{pmatrix} 2 \\ -c \end{pmatrix}N$ is acting in the direction due NorthEast. Find the value of c and magnitude of the resultant. (**5marks**)
7. Below were the grades of six A-level students in Mathematics(x) and Physics (y)

x	D	E	F	A	E	B
y	A	D	B	C	F	E

   Calculate the rank correlation coefficient for the data. (**5marks**)
8. A and B are two events such that $P(A \cup B) = 0.75$, $P(A \cap B') = 0.16$ and $P(A \cup B') = 0.52$. Find the $P(A \cap B)$ and $P(A'/B)$ (**5marks**)

SECTION B

9. (a) A coin is biased such that the chances of getting a head are thrice those of getting a tail. If this coin is tossed three times and X is the random number of heads that show up in these throws,
   (i) Construct a pdf for X
   (ii) Find the mean and variance for the number of heads. (**7marks**)
   (b) Given a random variable $Y \sim B(20,\ 0.45)$ Find
   (i) $P(Y > 7)$
   (ii) $P(6 \leq Y \leq 13)$ (**5marks**)

PREPARED BY SSEBALAMU ERICK TOM
0750547775

10. The table below gives yearly earnings in millions of shillings, of a group of workers in a certain factory

yearly earnings(in millions Ush)	**No of workers**
$10-<15$	6
$15-<20$	27
$20-<25$	45
$25-<30$	30
$30-<35$	15
$35-<40$	16
$40-<45$	11

(a) Calculate the: (i) mean yearly earning (**3marks**)
(ii) standard deviation of the distribution (**4marks**)

(b) Draw an ogive for the data and use it to find the percentage of workers earning sh43m and below (**5marks**)

END

PREPARED BY SSEBALAMU ERICK TOM
0750547775