NAME:
CLASS:

## MATHEMATICS P425/2 TEST FOR 15 JUNE 2018

## TIME: 1 HOUR

Answer all the questions.

1. A multiple choice exercise has ten questions each with 5 possible answers. If one student guesses all the questions, what is the probability that he gets at least 2 answers correct?
2. At 0900 hours two ships A and B are 10 km apart with B due east of A . A is travelling at $20 \mathrm{kmh}^{-1}$ in a direction $N 60^{0} \mathrm{E}$ and B is travelling at $10 \mathrm{kmh}^{-1}$ due north.

Show that if the two ships maintain these velocities, they will collide at approximately 0935 hours.
3. Use the trapezium rule with six ordinates to estimate $\int_{2}^{5} \log _{5} x d x$ correct to three decimal places.
4. Particles of masses $4 \mathrm{~kg}, 5 \mathrm{~kg}, 3 \mathrm{~kg}$ and 4 kg are attached at the corners $\mathrm{A}, \mathrm{B}, \mathrm{C}$ and D af a rectangle ABCD in which $\mathrm{AB}=12 \mathrm{~cm}$ and $\mathrm{BC}=20 \mathrm{~cm}$. Find the coordinates of the centre of the gravity of the particles.
5. A sample of size 49 is randomly drawn from a normal population with mean 54 and variance 64 . Find the probability that the mean will lie between 52 and 55.
6. The table below is an extract from tables of tangents.

| $\theta$ | $24^{\prime}$ | $30^{\prime}$ | $36^{\prime}$ | $42^{\prime}$ |
| :---: | :---: | :---: | :---: | :---: |
| $\tan 25^{\circ}$ | 0.4748 | 0.4770 | 0.4791 | 0.4813 |

Use linear interpolation or extrapolation to find,
(i) $\quad \tan 25^{\circ} 18^{\prime}$
(ii) $\tan ^{-1} 0.4775$.
7. A conical pendulum consists of a light inextensible string AB of length 60 cm fixed at A and carrying a bob of mass 1.2 kg at B . The bob describes a horizontal circle about the vertical through A with a constant angular speed of $5 \mathrm{rads}^{-1}$. Calculate the tension in the string.
8. A continuous random variable X has a probability distribution function given by $f(x)=\left\{\begin{array}{cc}\frac{1}{4} x\left(4-x^{2}\right): & 0 \leq x \leq 2 \\ 0 & \text { otherwise }\end{array}\right.$. Find the variance of X.

