## Sample Paper 6: Paper 2

## Question 8 (30 marks)

## Question 8 (a)

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True population proportion = Sample proportion }\pm1.96(Standard error of the proportion)
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Standard error of the proportion $=\sqrt{\frac{p(1-p)}{n}}$
Confidence interval
$=$ [sample parameter -1.96 (standard error), sample parameter +1.96 (standard error) $]$
For about $95 \%$ of all samples the confidence interval covers the population values of the parameter and for the other $5 \%$ it does not.
For a $99 \%$ confidence level, the confidence interval must be wider so that more samples cover the population parameter.

Confidence interval
$=[$ sample parameter -2.576 (standard error), sample parameter +2.576 (standard error) $]$

## Question 8 (b)

Sample proportion $p=\frac{200}{300}=\frac{2}{3}$
$n=300$
Population proportion $=\frac{2}{3} \pm 1 \cdot 96 \sqrt{\frac{\frac{2}{3}\left(1-\frac{2}{3}\right)}{300}}=0 \cdot 613,0 \cdot 72$
Confidence interval $=[0.613,0.72]$
For about $95 \%$ of all samples, the population proportion of all fifth years who believe the Junior Certificate should be scrapped is between $61.3 \%$ and $72 \%$.

## Question 8 (c)

Standard deviation of population $\sigma=10 \mathrm{~cm}$
Mean of the sample $\bar{x}=173 \mathrm{~cm}$
Number of the sample $n=50$

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\begin{aligned}
& \mu=\bar{x} \pm 1.96 \times \frac{\bar{\sigma}}{\sqrt{n}} \\
& \mu=173 \pm 1 \cdot 96 \times \frac{10}{\sqrt{50}}=170 \cdot 23,175 \cdot 77
\end{aligned}
$$

Population mean $\mu=$ ?

For about $95 \%$ of all samples, the population mean height of university students is between 170.23 cm and 175.77 cm .

