STUDENT ID        : _____

SEAT NUMBER       : _____

COURSE TITLE      : DIPLOMA IN BUSINESS ADMINISTRATION

MODULE TITLE      : BUSINESS DECISION MAKING

EXAM DATE         : 12 DECEMBER 2016

TIME              : 2:00 PM – 5:00 PM

## INSTRUCTIONS

**ANSWER 5 OUT OF 7 QUESTIONS (20 MARKS EACH)**

**NOTE THAT ONLY THE REQUIRED NUMBER OF QUESTIONS ANSWERED WILL BE MARKED BASED ON THE ORDER OF NUMBERING. ANY EXTRA QUESTIONS ATTEMPTED WILL BE VOIDED.**

**ESSENTIAL WORKINGS AND ANSWERS SHOULD BE WRITTEN ON THIS BOOKLET AS IN THE SPACE PROVIDED. OMISSION OF ESSENTIAL WORKINGS WILL RESULT IN THE LOSS OF MARKS.**

**ONLY CALCULATORS WITH THE "PSB ACADEMY APPROVED CALCULATOR" STICKERS ARE ALLOWED**

**FORMULAS/TABLES PROVIDED**

**PLEASE CIRCLE THE QUESTION NUMBER OF THE QUESTIONS THAT YOU HAVE ATTEMPTED.**

| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Marks |
|----------|---|---|---|---|---|---|---|-------------|
| **Marker** | | | | | | | | |
| **Moderator** | | | | | | | | |

## THERE ARE ALTOGETHER 21 PAGES IN THIS QUESTION PAPER

**Candidate's Signature: _____**            **Marker's Signature: _____**

1.   a.   Indicate whether the following variables are:
     1)   Qualitative or quantitative data (classify the quantitative variables as discrete or continuous), and
     2)   Nominal, ordinal, interval or ratio level of measurement

     (i)    The number of gold medals won in the 2016 Olympics
     (ii)   The rank of the top tennis players (first, second, and so on)
     (iii)  The highest temperature of the day
     (iv)   The favourite colours of a group of friends
     (v)    The amount spent on fine dining by Singaporeans

                                                                         (10 marks)

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1. b. Based on past survey findings, it is known that 26% of Singaporeans have fear of height. A researcher randomly selects 15 Singaporeans.
   i) What is the probability that exactly 5 have fear of height? (2 marks)
   ii) What is the probability that not more than one have fear of height? (4 marks)
   iii) What is the mean and standard deviation of the number of Singaporeans who have fear of height? (4 marks)
   For your final answers, please round up to 4 decimal places.

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2. a. A researcher is interested to find out the amount of time Singaporeans take to travel to work every morning. She interviewed 10 persons and the following are the time taken to travel to work in minutes:

11    20    38    9    47    28    31    19    28    42

Based on the sample data collected above, calculate the:
(i)    Mean                                                           (2 marks)
(ii)   Median                                                         (2 marks)
(iii)  Mode                                                           (1 mark)
(iv)   Range                                                          (1 mark)
(v)    Using the shortcut formula, find the **sample variance** and **standard deviation**. Show your working including the table for calculation.
                                                                      (5 marks)

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2.  b.  A medical student would like to find out what are the common sicknesses suffered by Singaporeans in the recent past. He visited a few neighbourhood clinics to collect some data and the findings are as follows:

| Sicknesses | Number |
|---|---|
| Common flu | 289 |
| Asthma | 101 |
| High blood pressure | 78 |
| Gastric problem | 175 |
| Chest infection | 92 |

If a Singaporean is selected randomly at a local clinic and assuming that this person only has one sickness, calculate the probability that the selected person is:

(i)   suffering from asthma.                                          (2 marks)

(ii)  suffering either from high blood pressure or chest infection. (2 marks)

(iii) not suffering from gastric problem.                            (2 marks)

(iv)  suffering neither from asthma nor common flu.                  (3 marks)

 For all your answers, please round up to **4 decimal places** when necessary.

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3.  a.  A statistics student would like to find out if there is a relationship between the amount spent on buying textbooks and final exam grades. Based on a research study, the Pearson's correlation for these two variables was found to be 0.88.

(i)  Identify the independent variable for this study.

(1 mark)

(ii)  What does the value of the Pearson's correlation coefficient tell you about the relationship between the amount spent on buying textbooks and final exam grades?

(3 marks)

(iii)  Calculate the coefficient of determination based on Pearson's correlation coefficient of 0.88. What does this tell you?

(4 marks)

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3. b.  The brand manager of Pepsi would like to find out if there is any association between the liking of Pepsi brand and race (Chinese, Malay and Indian). He conducted a survey and the findings are as follows:

| Like Pepsi | Chinese | Malay | Indian | Total |
|---|---|---|---|---|
| Yes | 30 | 38 | 29 | 97 |
| No | 55 | 21 | 12 | 88 |
| Total | 85 | 59 | 41 | 185 |

At 5% level of significance, test whether there is an association between the liking of Pepsi brand and race.

(12 marks)

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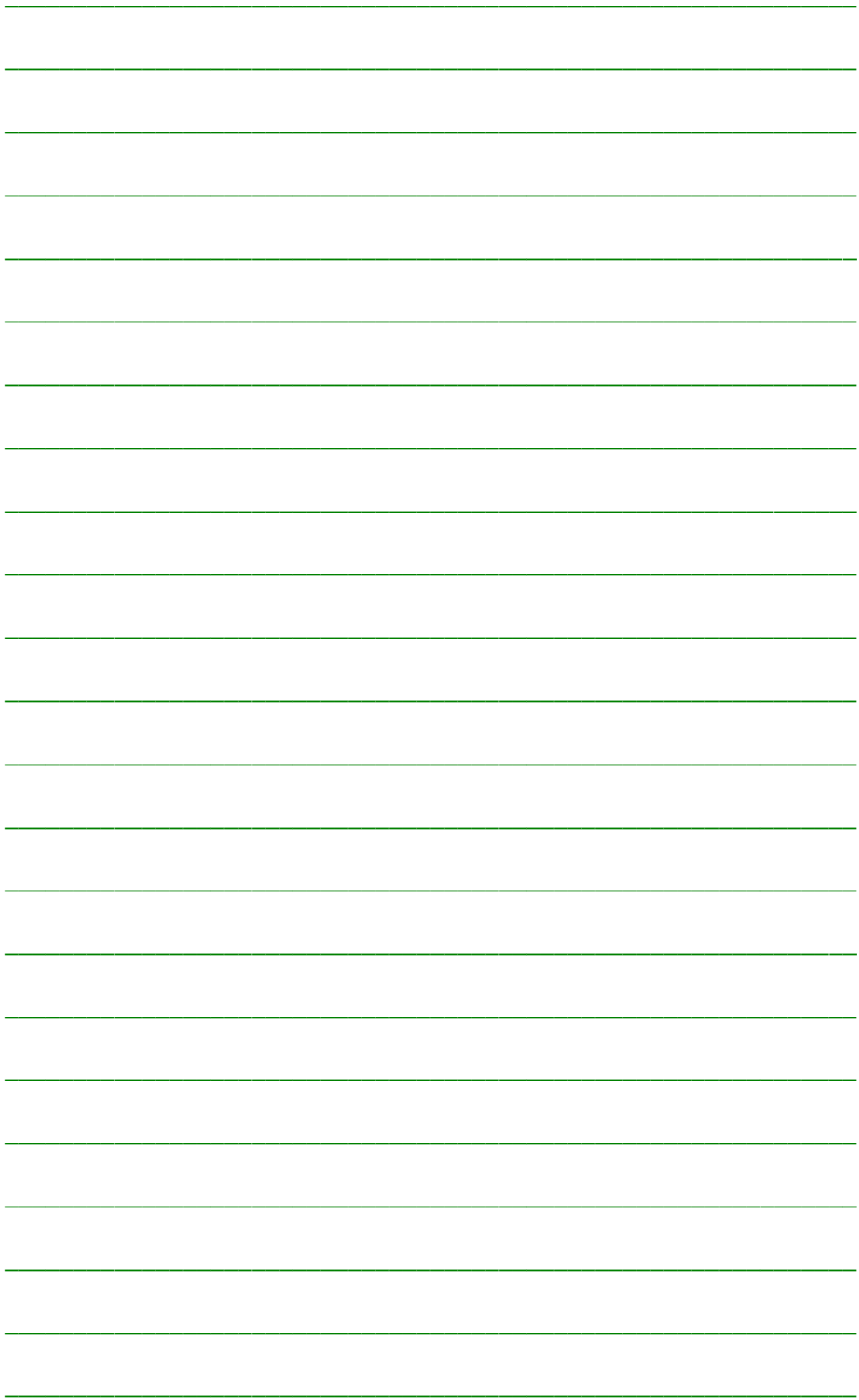
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4.　a.　A researcher wants to find out the amount of time Singaporeans spend on exercising in a week. He randomly selected 30 people and asked them to estimate the number of minutes they exercised in a week. The results are as follows:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | 22 | 35 | 40 | 55 | 59 | 60 | 60 | 65 | 79 |
| 88 | 90 | 97 | 108 | 112 | 119 | 128 | 133 | 149 | 168 |
| 172 | 184 | 189 | 200 | 229 | 239 | 260 | 290 | 338 | 363 |

(i)　Create a grouped frequency distribution with 5 classes using "15-84" as an initial class limit, as shown below. Complete the table below.　(9 marks)

(ii)　What is the proportion of Singaporeans who exercised 225 minutes or more per week?　(1 marks)

(i)

| Class Limits | Class Boundaries | Class Midpoints | Frequency | Relative Freq | Cumulative Frequency | Cumulative Relative Frequency |
|---|---|---|---|---|---|---|
| 15 – 84 | | | | | | |
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| Total | | | | | | |

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4.   b.   A new shopping mall has claimed that its shoppers would spend more than $89 in its mall. A random sample of 250 shoppers was selected in this new shopping mall and the sample average amount spent in the mall for each shopping trip was found to be $93. Assuming that the population standard deviation for the amount spend in a shopping trip is $16.
Using 1% level of significance, is there enough evidence to support the new shopping mall's claim that the average amount spent per shopping trip is more than $89?
Include a diagram showing the test value and critical region.

(10 marks)

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5. a. A recent report claimed that people are using less of Facebook and as a result, the number of friends a person has on Facebook is now less than 155. A random sample of 23 respondents is selected and the sample mean number of Facebook friends is 152 with a sample standard deviation of 6 people. The distribution of the number of friends a person has on Facebook is assumed to be normally distributed.

Using 5% level of significance, test whether there is enough evidence to support the report's claim that the number of friends a person has on Facebook is now less than 155.

Include a diagram showing the test value and critical region.

(10 marks)

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5.  b.  A college randomly selected 20 days to find out the number of students who were late for tutorials. The college finds the sample average number of students who were late for tutorials per day is 36 with a sample standard deviation of 5 students.

   (i)   Construct a 95% confidence interval for the population mean number of students who were late for tutorials.

(4 marks)

   (ii)  Interpret the confidence interval computed in part (i).

(3 marks)

   (iii) If the confidence level is changed to 90% with the sample size remains unchanged at 20 days, without showing any calculation, discuss the change on the confidence interval.

(3 marks)

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6.   a.   A researcher conducted a survey to find out the preferred taxi apps used by Singaporeans. He interviewed 550 commuters and the findings are as followed:

| | | Preferred app | | Total |
|---|---|---|---|---|
| | | Grab Taxi | Uber | |
| Occupation | PMEBs | 116 | 129 | 245 |
| | White collar | 209 | 96 | 305 |
| | Total | 325 | 225 | 550 |

Find the probability of selecting a person who

(i)    preferred to use Uber                            (2 marks)

(ii)   is a PMEB                                    (2 marks)

(iii)  preferred Grab Taxi and is a white collar        (2 marks)

(iv)  prefers Uber, given that the person is a PMEB    (2 marks)

(v)    Are the events "preferred Grab Taxi" and "PMEBs" mutually exclusive? Explain your decision.           (2 marks)

For all your answers, round up to 4 decimal places.

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6.  b.  A study was conducted to determine the average monthly income of hawkers in Singapore. 240 hawkers in Singapore were selected and the sample mean income of these hawkers is $2350. Assume that the population standard deviation of the average monthly income of hawkers is $390.

(i) Construct a 90% confidence interval for the population mean monthly income of hawkers in Singapore.

(4 marks)

(ii) Interpret the confidence interval computed in part (i).

(3 marks)

(iii) With a 90% confidence level, how large of a sample would have to be taken to estimate a population mean to within $30?

(3 marks)

7.    a.    In Singapore, car owners spent an average of $1850 a year to maintain their private cars. The population standard deviation of the yearly amount spent is $570. The yearly amount spent by car owners to maintain their cars is assumed to be normally distributed.

(i)    What is the probability that a randomly selected car owner will spend less than $1500 on car maintenance?                    (3 marks)

(ii)    Using the probability calculated in part (i), if 120 Singaporeans are randomly selected, how many of them will spend less than $1500 a year on car maintenance?                    (2 marks)

(iii)    A random sample of 80 car owners is chosen. Calculate the probability that these car owners will spend between $1799 to $2000 a year on car maintenance?                    (5 marks)

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7.  b.  PSB Academy would like to find out if there is a relationship between the number of hours a student spent on watching TV drama and the overall mark obtained for BDM subject. The school randomly selected 8 students and the findings are as follows:

| Number of hours watching TV drama | Overall BDM mark |
|---|---|
| 9 | 89 |
| 25 | 80 |
| 40 | 70 |
| 50 | 65 |
| 17 | 78 |
| 28 | 80 |
| 27 | 77 |
| 12 | 82 |

(i)   Identify the independent variable and dependent variable.

(1 mark)

(ii)  Find the line of best fit.
Leave your answers in **3 decimal places**.

(7 marks)

(iii) If a student spent 30 hours watching TV drama, what will be the predicted overall BDM mark based on line of best fit found in part (ii)

(2 marks)

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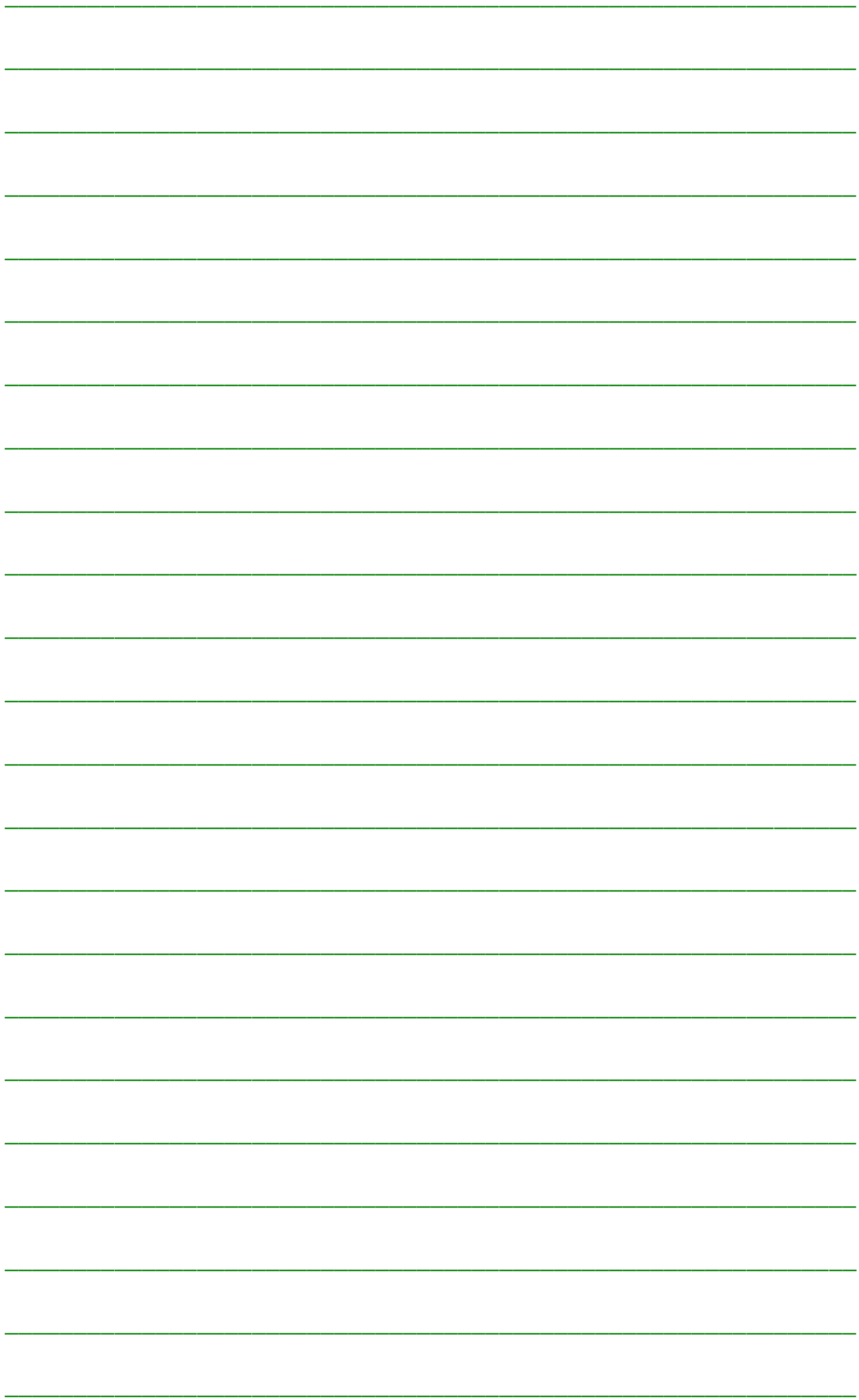
**(EXTRA WORKING SPACE)**

**(EXTRA WORKING SPACE)**