



**UNIVERSITI TEKNOLOGI MARA
FINAL EXAMINATION**

COURSE	: INTRODUCTION TO PROBABILITY AND STATISTICS
COURSE CODE	: STA116
EXAMINATION	: SEPTEMBER 2015
TIME	: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of ten (10) questions.
2. Answer ALL questions in the Answer Booklet. Start each answer on a new page.
3. Do not bring any material into the examination room unless permission is given by the invigilator.
4. Please check to make sure that this examination pack consists of :
 - i) the Question Paper
 - ii) a graph paper – provided by the Faculty
 - iii) an Answer Booklet – provided by the Faculty
 - iv) a two – page Appendix 1
 - v) a Statistical Table – provided by the Faculty
5. Answer ALL questions in English.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This examination paper consists of 6 printed pages

QUESTION 1

The following table shows the number of students grouped according to blood type.

Blood Type	Number of students
A	6
B	10
O	20
AB	4

$$A = \frac{6}{40} \times 100\% = 15\%$$

$$B = \frac{10}{40} \times 100\% = 25\%$$

$$O = \frac{20}{40} \times 100\% = 50\% \quad (5 \text{ marks})$$

$$AB = \frac{4}{40} \times 100\% = 10\%$$

Draw a pie chart to represent the above data.

QUESTION 2

The following frequency distribution table shows the time students spent studying for an examination.

Time (hour)	Number of students	f	(f)
5 - 9	2	2	2
10 - 14	4	12	6
15 - 19	7	17	13
20 - 24	9	22	22
25 - 29	12	27	34
30 - 34	11	32	45
35 - 39	4	37	49
40 - 44	1	42	50

$$\bar{x} = \frac{\sum fx}{n} = \frac{1245}{50} = 24.9 \quad (2)$$

- i) mean
- ii) median
- iii) standard deviation

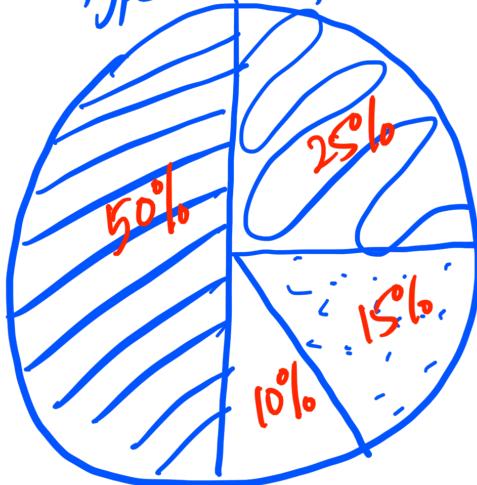
Shift [2] [1] [=] (3 marks)

- b) Determine the shape of the distribution based on Pearson's coefficient of skewness.

(2 marks)

①

A Pie Chart of the Blood Type of Students



O	11
B	11
A	6
AB	3

$$\textcircled{2} \text{ Position median} = \frac{\sum f}{2}$$

$$= \frac{50}{2}$$

$$= 25$$

$$\textcircled{2} \text{ (a) (ii)} \text{ Median, } \tilde{x} = L_m + \left[\frac{\frac{\sum f}{2} - \sum f_{m-1}}{f_m} \right] \cdot C$$

$$= 24.5 + \left[\frac{\frac{50}{2} - 22}{12} \right] \cdot (29.5 - 24.5)$$

$$= 25.75 \quad *$$

(iii)

$$s = \sqrt{\frac{1}{n-1} \left[\sum f x^2 - \frac{(\sum f x)^2}{n} \right]}$$

$$= \sqrt{\frac{1}{50-1} \left[34305 - \frac{(1245)^2}{50} \right]} \quad \textcircled{3}$$

$$= 8.2121 \quad //$$

Shift
2 3 E

$$\text{Variance, } s^2 = (8.2121)^2$$

$$= 67.4388$$

QUESTION 3

- a) The five finalists in the Miss Universe contest are Miss Argentina, Miss Belgium, Miss Japan, Miss India, and Miss Australia. Determine the number of ways that the judges can choose the winner, the first runner-up, and the second runner-up.

$$5P_3 = 60 \text{ } \cancel{*} \quad @ \quad 5 \times 4 \times 3 = 60 \text{ } \cancel{*} \quad (2 \text{ marks})$$

- b) There are 10 male students and 20 female students in a class. A teacher wants to select 4 students to participate in a debate competition. Determine the number of ways that the selection can be made if the number of male students is **more than** the number of female students in the team.

(3 marks)

- c) Helang Hotel and Kenari Hotel offered Deluxe and Superior rooms for a group of **200** tourists. A total of 90 tourists stayed in Helang Hotel where 70 of them took Deluxe rooms. Of the tourists who stayed in Kenari Hotel, 60 took Superior rooms. A tourist is selected at random. Calculate the probability that

- i) the tourist took a Superior room.
ii) he or she stayed in Hotel Kenari **given that** the tourist took a Deluxe room.

(5 marks)

QUESTION 4

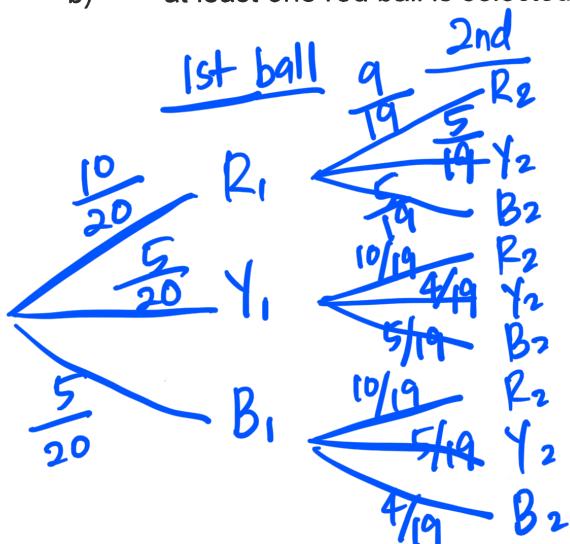
A bag contains 10 red balls, 5 yellow balls and 5 blue balls. Two balls are randomly chosen from the bag. Find the probability that

- a) the two balls are of the same colour.

(4 marks)

- b) at least one red ball is selected.

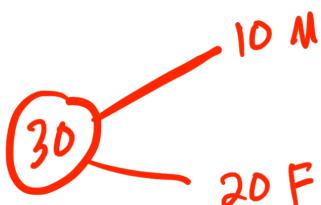
(6 marks)



$$\begin{aligned}
(a) \quad & P(R_1 R_2) + P(Y_1 Y_2) + P(B_1 B_2) \\
& = \left(\frac{10}{20} \times \frac{9}{19} \right) + \left(\frac{5}{20} \times \frac{4}{19} \right) + \left(\frac{5}{20} \times \frac{4}{19} \right) \\
& = \frac{13}{38} = 0.3421 \text{ } \cancel{*}
\end{aligned}$$

$$\begin{aligned}
(b) \quad & P(R_1 R_2) + P(R_1 Y_2) + P(R_1 B_2) + \\
& \quad P(Y_1 R_2) + P(Y_1 Y_2) + P(Y_1 B_2) + \\
& \quad P(B_1 R_2) + P(B_1 Y_2) + P(B_1 B_2) \\
& = \left(\frac{10}{20} \times \frac{9}{19} \right) + \left(\frac{10}{20} \times \frac{5}{19} \right) + \left(\frac{10}{20} \times \frac{5}{19} \right) + \\
& \quad \left(\frac{5}{20} \times \frac{10}{19} \right) + \left(\frac{5}{20} \times \frac{5}{19} \right) + \left(\frac{5}{20} \times \frac{5}{19} \right) + \\
& \quad \left(\frac{5}{20} \times \frac{4}{19} \right) + \left(\frac{5}{20} \times \frac{4}{19} \right) + \left(\frac{5}{20} \times \frac{4}{19} \right) \\
& = \frac{29}{38} = 0.7632 \text{ } \cancel{*}
\end{aligned}$$

3.(b)

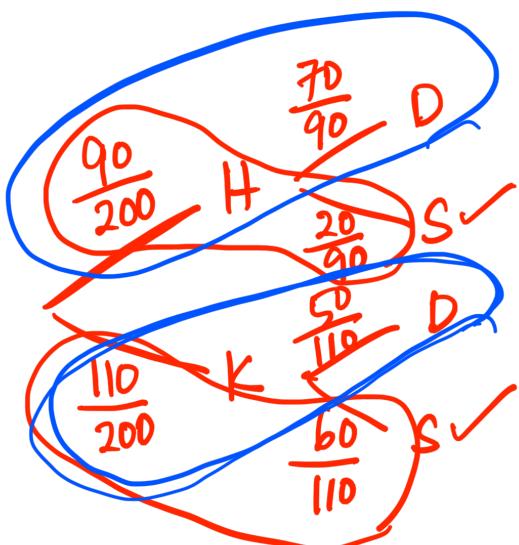


$$\begin{array}{c|c} (10) & (20) \\ M & F \\ \hline (3) & (1) = 4 \\ (4) & (0) = 4 \end{array}$$

$$④ \rightarrow M > F$$

$$({}^{10}C_3 \times {}^{20}G_1) + ({}^{10}C_4 \times {}^{20}G_0) = 2610 *$$

(c)



$$\begin{aligned} (i) P(S) &= \left(\frac{90}{200} \times \frac{20}{90} \right) + \left(\frac{110}{200} \times \frac{60}{110} \right) \\ &= \frac{2}{5} = 0.4 * \end{aligned}$$

$$(ii) P(K | D) = \frac{P(K \cap D)}{P(D)}$$

$$= \frac{\frac{110}{200} \times \frac{50}{110}}{1 - 0.4}$$

$$= \frac{5}{12} = 0.4167 *$$

	Deluxe	Superior	Total
Helang	70	20	90
Kenari	50	60	110