UNIVERSITI TEKNOLOGI MARA
FINAL EXAMINATION

COURSE	:	**INTRODUCTION TO PROBABILITY AND STATISTICS**
COURSE CODE	:	**STA116**
EXAMINATION	:	**MARCH 2017**
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

State the type of the following variables.

a) Qualifications of candidates for a particular job. Qualitative variable

(1 mark)

b) Number of UiTM graduates. Quantitative discrete variable

(1 mark)

c) Computer brands exhibited at a computer fair. Qualitative

(1 mark)

d) Age of the workers in a plastic manufacturing company.

Quantitative continuous

(1 mark)

e) Temperature of a room.

Quantitative continuous

(1 mark)

QUESTION 2

a) The following table shows the information regarding the customer satisfaction towards services provided by a bank counter at Affan Bank in a month. Draw a component bar chart to present the data.

Overall Satisfaction Towards Facilities Provided	Race		
	Malay	Chinese	Indian
Not Satisfied	270	220	150
Satisfied	450	250	210

(4 marks)

b) The following frequency distribution shows the age of Takaful Insurance agents at a particular agency in Melaka.

Age (years)	Number of agents	x
20 to less than 25	3	22.5
25 to less than 30	2	27.5
30 to less than 35	7	32.5
35 to less than 40	18	37.5
40 to less than 45	16	42.5
45 to less than 50	3	47.5
50 to less than 55	1	52.5

Calculate the mean and standard deviation. Interpret the meaning of mean value obtained.

(6 marks)

2.(b) $n = 50, \Sigma fx = 1891, \Sigma fx^2 = 73492$

$$\bar{x} = \frac{\Sigma fx}{n} = \frac{1891}{50} = 37.82 \text{ ✱}$$

$$s = \sqrt{\frac{1}{n-1}\left[\Sigma fx^2 - \frac{(\Sigma fx)^2}{n}\right]}$$

$$= \sqrt{\frac{1}{50-1}\left[73492 - \frac{(1891)^2}{50}\right]}$$

$$= 6.3477 \text{ ✱}$$

On average, the age of the Takaful Insurance cegmt are around 37.82 years.

QUESTION 3

a) A team of worker at Majlis Perbandaran Dungun plans to use 12 pots of different flowers to decorate a stage in Dewan Dataran Merdeka Dungun. These pots are to be arranged in a row. Determine number of ways the arrangement can be done.

(2 marks)

$12! = 479\,001\,600$ #

b) Shortly after being put into service, some buses manufactured by a certain company have developed cracks on the underside of the main frame. Suppose a particular city has 25 of these buses and cracks have actually appeared in 8 of them.

i) Determine number of ways to select a sample of 5 buses for a thorough inspection.

ii) Determine number of ways to select a sample of 5 buses that contain exactly 4 buses with visible cracks.

(3 marks)

c) Given that $P(A) = \frac{8}{21}$, $P(B|A) = \frac{3}{4}$ and $P(A' \cap B) = \frac{10}{21}$. Compute

i) P (B).

ii) P (A|B).

(5 marks)

(i) $P(A' \cap B) = P(B) - P(A \cap B)$ → $P(B) = P(A' \cap B) + P(A \cap B)$

$= \frac{10}{21} + \frac{2}{7} = \frac{16}{21}$ #

$P(B|A) = \frac{P(A \cap B)}{P(A)}$ ⇒ $P(A \cap B) = P(B|A)P(A)$

$= \frac{3}{4} \times \frac{8}{21} = \frac{2}{7}$

(ii) $\frac{P(A \cap B)}{P(B)} = \frac{2/7}{16/21} = \frac{3}{8}$

QUESTION 4

The probabilities that Nurin, Syazwan and Ammar will be offered a scholarship to further their studies at ABC University are 0.40, 0.35 and 0.25 respectively. The probabilities that they will accept the offer are 0.85, 0.90 and 0.95 respectively.

a) Draw a tree diagram for the above situation.

(3 marks)

b) Calculate the probability that a person chosen at random rejects the offer.

(2 marks)

c) Calculate the probability that Syazwan will be offered a scholarship and accepts the offer.

(2 marks)

d) If an offer was rejected, calculate the probability that the scholarship was offered to Nurin.

(3 marks)

(a) N 0.4 → 0.85 AO; 0.15 AO'

S 0.35 → 0.90 AO; 0.10 AO'

A 0.25 → 0.95 AO; 0.05 AO'

(b) $P(AO') = (0.4 \times 0.15) + (0.35 \times 0.10) + (0.25 \times 0.05)$

$= 0.1075$ #

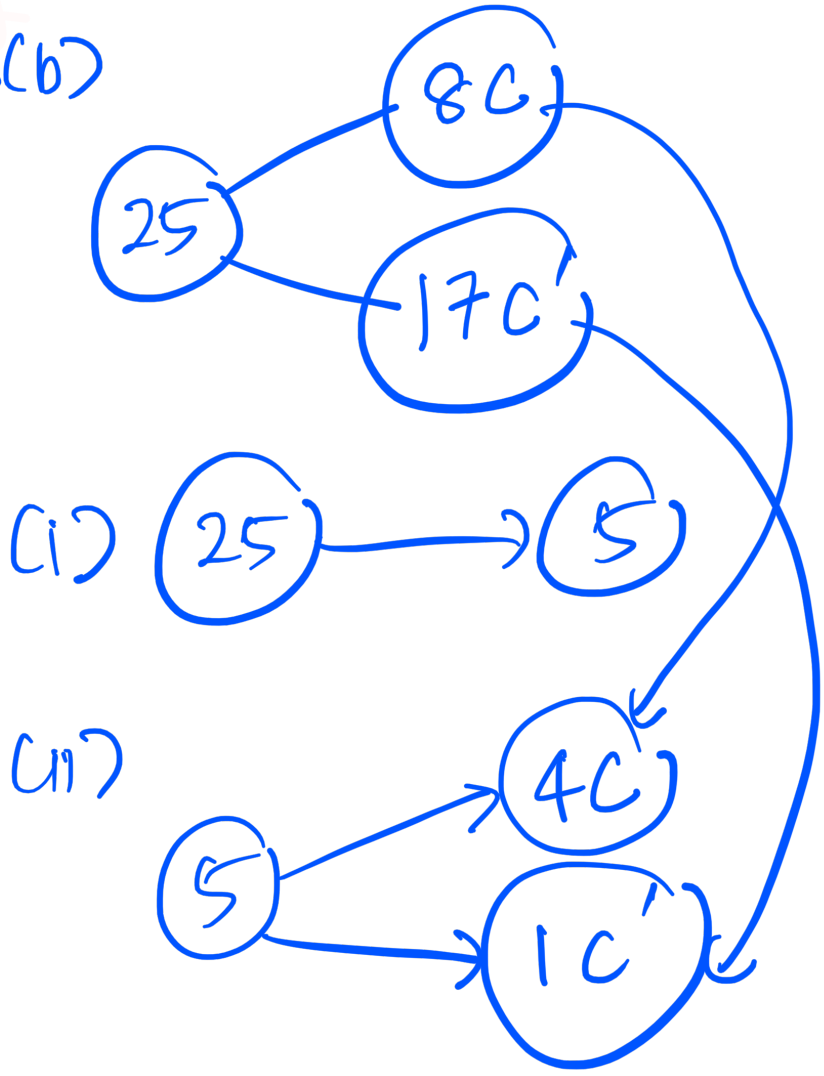
(c) $P(S \cap AO) = 0.35 \times 0.90$

$= 0.315$ #

(d) $P(N \mid AO') = \frac{P(N \cap AO')}{P(AO')} = \frac{0.4 \times 0.15}{0.1075}$

$= 0.5581$ ✱

3(b)



(i)

$^{25}C_5 = 53\,130$ ✱

(ii)

$^{8}C_4 \times {}^{17}C_1 = 1190$ ✱