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OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS
2017 /2018 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER REGULAR EXAMINATION

FOR THE DIPLOMA OF BUSINESS MANAGEMENT

COURSE CODE: **DBM 04**

COURSE TITLE: **QUANTITATIVE TECHNIQUES**

DATE: 30TH APRIL, 2018 **TIME: 9AM – 12.00 NOON**

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

THIS PAPER CONSISTS OF 7 PRINTED PAGES **PLEASE TURN OVER**

DBM 04: QUANTITATIVE TECHNIQUES

STREAM: DBM **DURATION 3 HOURS**

INSTRUCTIONS TO CANDIDATES

i. *Answer Question **ONE** and any other **TWO** questions.*

ii. *Question **ONE** carries **30 Marks***

iii. *Do not write on the question paper*

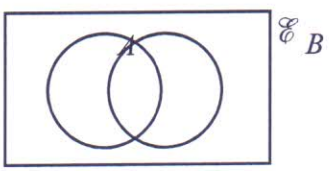
Question One

a) Solve the inequality

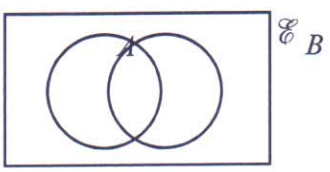
$$2(x - 3) < 5x + 3$$ (3 marks)

b) In each of the Venn diagrams, shade the region indicated.

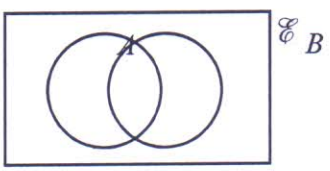
(i) $A \quad B$



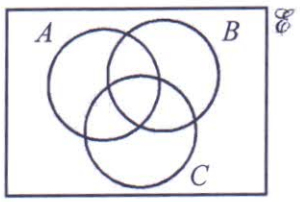
(ii) The complement of $(A \quad B)$



iii) The complement of $(A \quad B)$



(iv) A (B C)



(8 marks)

(c) Given a set of data; 2,9,8,4,7,6

i) Calculate the arithmetic mean (2 marks)

ii) Calculate the geometric mean (2 marks)

iii) Calculate the harmonic mean (2 marks)

iv) State the median (1 mark)

v) Calculate the standard deviation. (3 marks)

d) A publisher is planning to produce a new textbook. The fixed costs are Sh. 320,000 and the variable costs are Sh. 31.25 per book. The wholesale price will be Sh. 43.75 per book. How many books must the publisher sell to break-even? (5 marks)

e) A senior lecturer is set to give a series of four lectures. If he doesn't give any one lecture, the lecture is given by his assistant. He is certain to give the first lecture. The probability of giving the second lecture is 0.45. If he gives the second lecture, the probability of giving the third lecture is 0.7, otherwise it is 0.4. If he gives the third lecture, the probability of giving the fourth lecture is 0.35 otherwise it is 0.7.Calculate the probability that the lecturer

i) Gives all the four lectures

ii) Gives two lectures only

Iii) Gives lecture one and lecture four only. (5 marks)

Question Two

Let $\xi = \{x : 1 \leq x < 17, x \quad \mathbb{N}\}$.

a) P , Q and R are the subsets of ξ such that

P = {multiples of four};

Q = (factors of 36};

R = {square numbers}

(a) List the elements of

(i) ξ
(ii) $P \quad Q \quad R$. (2 marks)

(b) Describe in words the set $P \quad Q$. (1 mark)

(c) (i) Draw a Venn diagram to show the relationship between sets P, Q and R. (2 marks)

(ii) Write the elements of ξ in the appropriate places on the Venn diagram. (1 mark)

b) In a club with 60 members, everyone attends either on Tuesday for Drama (D) or on Thursday for Sports (S) or on both days for Drama and Sports.

One week it is found that 48 members attend for Drama and 44 members attend for Sports and x members attend for both Drama and Sports.

(i) Draw and **label fully** a Venn diagram to illustrate this information.

(3 marks)

(ii) Find the number of members who attend for both Drama and Sports.

(2 Marks)

(iii) Describe, in words, the set represented by $(D \quad S)'$.

(iv) What is the probability that a member selected at random attends for Drama only or Sports only? (3 marks)

The club has 28 female members, 8 of whom attend for both Drama and Sports.

What is the probability that a member of the club selected at random

(i) is female and attends for Drama only or Sports on (1 mark)

(ii) is male and attends for both Drama and Sports? (2 marks)

Question Three

a) A market researcher investigating consumers' reference for three brands of beverages namely: coffee, tea and cocoa, in Kisii Town gathered the following information. From a sample of 800 consumers, 230 took coffee, 245 took tea and 325 took cocoa, 30 took all the three beverages, 70 took coffee and cocoa, 110 took coffee only, 185 took cocoa only.

Required:

(i) Present the above information in a Venn diagram

(ii) The number of customers who took tea only

(iii) The number of customers who took coffee and tea only

(iv) The number of customers who took tea and cocoa only

(v) The number of customers who took none of the beverages. (10 marks)

b) A public transportation company has been experimenting on a possibility of developing a system of charging fares .The demand functions, which expresses the ridership as a function of fare charged is given below:

$$Q=10,000 - 125p$$

Where Q equals the average number of riders per hour and p equals the fare in shillings.

(i) Determine the fare, which should be charged in order to maximize hourly bus fare revenue.

(ii) What is the expected maximum revenue?

(iii) How many riders per hour are expected under this figure? (10 marks)

Question Four

The age of each patient over the age of 14 visiting a doctor's practice in one day was recorded as

18	18	76	15	72	45	48	62
21	27	45	43	28	19	17	37
35	34	23	25	46	56	32	18
24	34	32	56	29	43		

Use a tally chart to produce a grouped frequency distribution with age groups 15-19, 20-24, 25-29 etc. (3marks)

a. What is the relative frequency of patients in the age groups 70-74? (2marks)

b. Express the number of patients in the age group 25-29 as a percentage (2marks)

c. Calculate the mean and the standard deviation (6marks)

d. Calculate the median (3marks)

e. Calculate the Pearson's coefficient of skewness. (4marks

Question Five

a) State Four advantages and Three disadvantages of Linear programming. (7 marks)

b) A firm is engaged in producing two products A and B. each unit of product A requires 2 kg of raw material and 4 labour hours for processing, whereas each unit of product B requires 3 kg of raw material and 3 hours of labour, of the same type. Every week, the firm has an availability of 60 kg of raw material and 96 labour hours. One unit of product A sold yields Sh. 40 and one unit of product sold gives Sh. 35 as profit. (13 marks)

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