

**THE INSTITUTE OF CHARTERED
ACCOUNTANTS (GHANA)**



**MAY 2006 EXAMINATIONS
(PROFESSIONAL)**

**QUANTITATIVE TECHNIQUES
(Special Paper)**

Attempt ANY Five (5) Questions

TIME ALLOWED: 3 HOURS

QUESTION 1

- (a) Explain the following:
- i) Coefficient of correlation
 - ii) Coefficient of determination (4 marks)
- (b) TEECO GARAGE deals in second-hand cars imported from Europe. The company wishes to study the relationship between the age of a car and its selling price. Listed below is a random sample of 12 second-hand cars sold at TEECO GARAGE during the last year.

<u>Car</u>	<u>Age (Years)</u>	<u>Selling Price (€ million)</u>
1	9	48.6
2	7	36.0
3	11	21.6
4	12	24.0
5	8	30.0
6	7	60.0
7	8	45.6
8	11	48.0
9	10	48.0
10	12	24.0
11	6	51.6
12	6	48.0

- (i) If TEECO GARAGE wants to estimate selling price based on the age of the car, which variable is the dependent variable and which is the independent variable? (1 mark)
- (ii) Calculate the coefficient of correlation. (10 marks)
- (iii) Calculate the coefficient of determination. (2 marks)
- (iv) Interpret these statistical measures. (3 marks)

(Total: 20 marks)

QUESTION 2

- (a) State one (1) concept or approach of defining probability. (1 mark)
- (b) Give one (1) example of
- (i) mutually exclusive event (2 marks)
 - (ii) independent event (2 marks)
- (c) The Divisional Police Commander at Alcapone District classifies crime in his District by age (in years) of the criminal and whether the crime is violent or non-violent. The Table below shows the commander's report for the year 2005:

Type of crime	Age (in years)			Total
	Under 20	20 – 40	Over 40	
Violent	54	82	28	164
Non-violent	24	68	44	136
Total	78	150	72	300

Required:

- (i) What is the probability of selecting a case to analyse and finding it involved a violent crime? (5 marks)
- (ii) Given that a violent crime is selected for analysis, what is the probability that a person committed the crime under 20 years? (5 marks)
- (iii) Two (2) crimes are selected for review by a judge. What is the probability that both are violent crimes? (5 marks)

(Total: 20 marks)

QUESTION 3

- (a) State the steps one goes through in testing a hypothesis. (5 marks)

- (b) DRESSWELL Company organized a survey on the opinions of its customer on a new line of dresses. The results are as follows:

<u>Opinion</u>	<u>Number of customers</u>
Outstanding	94
Excellent	90
Very Good	80
Good	78
Fair	70
Undesirable	68

The production manager viewed the survey results as a mandate to go into mass production of dresses since the largest number (94) of customers survey indicated the new line of dresses is outstanding. Do you agree with him? Test at the 0.1 level of significance. (15 marks)

(Total: 20 marks)

QUESTION 4

- (a) Write in nine (9) terms between 50 and 200 so that an arithmetic progression is formed. (5 marks)
- (b) Akosua deposited ₦100,000 at the end of each year for 25 years. During the first 15 years, the bank paid interest at the rate of 12% effective. During the last 10 years, the interest rate fell to 8% effective. Calculate the amount to Akosua's credit at the end of 25 years. (5 marks)
- (c) Mr K Wahalavich is an employee of MAYEHOT Company. He wishes to buy a Deep Freezer, a Refrigerator and a 21" Television set on an instalment plan (hire purchase) basis. He agrees with the shop-owner to pay ₦500,000 at the end of each month for two (2) years.

Should Mr K Wahalavich decide to pay cash now for all the three items, how much will he pay if money is worth 12% compounded monthly? (10 marks)

(Total: 20 marks)

QUESTION 5

AKO Company manufactures a prestigious product. The marginal cost of production (in ₦' 000) is $MC = 14 + 0.9q$ where q is the volume of production each day. The

marginal revenue from sales (in ¢'000s) is $MR = 22 - 0.2q$ where q is the volume of sales each day. The company wishes to increase production from 24 to 40 units. The company knows that sales volume can only be increased when there is a reduction in price.

- (a) By how much should the price be reduced? (8 marks)
- (b) By how much would total daily Revenue increase? (4 marks)
- (c) What effect would this increase have on the daily profit of the company? (8 marks)

(Total: 20 marks)

QUESTION 6

- (a) Explain the term:
 - (i) Economic order quantity. (3 marks)
 - (ii) State the relationship between The Annual Holding Cost and Annual Ordering Cost at the Economic Order Quantity. (1 mark)
- (b) BEKIND Company sells soft drinks. One of the soft drinks (Ahavivi) has a constant annual demand rate of 14,400 crates. A crate of the soft drink costs ¢50,000. Ordering costs are ¢200,000. per order and holding costs per unit per year are 25% of the value of the inventory. BEKIND has 250 working days per year, and the lead time is 5 days. Calculate, the
 - (i) Economic order quantity (EOQ). (4 marks)
 - (ii) Re-order point. (4 marks)
 - (iii) Cycle time (4 marks)
 - (iii) Total Annual Cost if the company adopts your EOQ at (i) above. (4 marks)

(Total: 20 marks)

QUESTION 7

Mr DIPLANNER is in-charge of planning and co-ordinating this year's Professionals Conference to be held in Accra. The activities, their immediate predecessors, and the activity time estimates (in weeks) are as follows:

Time (weeks)

Activity	Immediate Predecessor	Optimistic	Most Likely	Pessimistic
A	-	4	4	4
B	A	16	24	32
C	A	8	16	24
D	B, C	4	8	12
E	B	8	12	16
F	A	4	8	12
G	D	4	8	12
H	G	4	8	12
I	E, H, F	4	4	4

Required:

- a) Draw a project network. (6 marks)
- b) Calculate the expected activity duration. (4 marks)
- c) What are the critical activities and what is the expected project completion time? (2 marks)
- d) What is the probability that the project will be completed within 50 weeks? (8 marks)

(Total: 20 marks)