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THE OPEN UNIVERSITY OF SRI LANKA  
Department of Civil Engineering  
Postgraduate Diploma in Technology - Construction Management - Level 7



CEX7107 - Construction Productivity & Quantitative Techniques

FINAL EXAMINATION - 2009

Time Allowed: Three Hours

Date: 2010 - 03 - 16 (Tuesday)

Time: 0930 - 1230 hrs

Answer Four (04) questions.

**SECTION A - CONSTRUCTION PRODUCTIVITY**

**Q1.**

- i.) For understanding the levels of productivity in construction operations and formulating measures to increase productivity, 'Method Study' is a very useful tool. Describe the different stages in the process of method study. (08 marks)
- ii.) Multiple Activity Charts are a very useful tool in process evaluation of an operation (or in other words, Method Study). Describe the utility of multiple activity charts in above type of applications. (08 marks)
- iii.) Productivity in construction is influenced technical as well as social factors. Name and describe *five* (05) such factors that you consider to be most prominent, with reasons. (09 marks)

**Q2.**

- i.) Incentives, in contrast to remuneration, are considered to have catalytic effect on the productivity of operations involving human labour. Discuss with examples, the *three* (03) broad areas into which incentives can be categorized. (08 marks)
- ii.) Discuss the relative merits and demerits of the following *three* (03) financial incentive schemes with reference to labour involved in building construction work;
  - a.) Piecework schemes
  - b.) Hours saved schemes
  - c.) Group schemes
 (08 marks)
- iii.) When chairing a regular Project Progress Meeting several important items should be clarified in the mind of a Project Manager, so as to improve the productivity of the meeting itself and expedite project targets. Identify and describe these items. (09 marks)

**Q3.**

- i.) Activity sampling is a widely used method in estimating productivity. Describe the method of activity sampling and discuss the advantages of this method over other alternatives. (08 marks)
- ii.) Write brief descriptions of *ten* (10) most significant "Time Robbers", that undermine the productivity of Project Managers involved in construction projects. (08 marks)
- iii.) Over the duration of a project, the Project Manager has to engage many times in the process of negotiation. Define the term "Negotiation" and explain its importance. Prepare a of list guidelines for the process to be effective. (09 marks)



**SECTION B - QUANTITATIVE TECHNIQUES**

Q4.

The following table summarizes the ages of viewers of two television programmes A and B. The sample included 500 viewers. In the sample, 217 viewers were found to watch programme A while the number of viewers for programme B was 73.

Age group	No. of viewers for programme A	No. of viewers for programme B
15 - 24	39	11
25 - 34	87	23
35 - 44	72	28
45 - 54	19	11
Total	217	73

- a.) Briefly explain, which graphically summary you would choose to compare the age distributions of viewers for the programmes A and B. Give reasons for your choice. (08 marks)
- b.) Consider the viewers for programme A.
- What are the true class limits of the median class? (05 marks)
  - What is the median age? (05 marks)
  - Estimate the proportion of viewers younger than 30. (07 marks)

Q5.

An insurance company offers three policies A, B and C. Policy A is a life insurance plan and the probability that a sale is successful on a single appointment is 0.3. Policy B is a medical insurance plan and the probability that a sale is successful on an appointment is 0.4. Policy C is a vehicle insurance plan and the probability that a sale is successful on an appointment is 0.1. Suppose that on a given day a branch of the company makes around 30, 50 and 20 appointments regarding policies A, B and C respectively.

- What is the probability that a sale is successful on a given day? (06 marks)
- If a sale is successful what is the probability that it is a life insurance policy? (06 marks)
- Estimate the number of successful sales on a randomly chosen day. (06 marks)
- Estimates the number of successful sales on life insurance policies on a randomly chosen day. (07 marks)

Q6.

The accompanying table summarizes the amount of sales ( $y$ ) (in thousands of Rupees) and advertising expenditure ( $x$ ) (in thousands of Rupees) of a company.

Amount of sales $y$ (in thousands)	13	13	14	14	15	15	15	20	20	20
Advertising expenditure $x$ (in thousands)	2.0	1.5	2.2	2.3	2.7	2.6	2.8	3.1	3.3	3.2

Summary statistics are:

$$\sum x_i = 25.7, \sum y_i = 159, \sum x_i^2 = 69.01, \sum y_i^2 = 2605, \sum x_i y_i = 422$$

- Compute the correlation coefficient  $r$ , between the amount of sales and advertising expenditure and interpret it. (06 marks)
- Compute the value of  $r^2$  and interpret it. (06 marks)
- Estimate the slope of the regression line that can be used to predict the amount of sales using the amount on advertising expenditure and interpret it. (08 marks)
- Predict the amount of sales, if Rs. 3000/- is spent on advertising expenditure. (05 marks)

