THE OPEN UNIVERSITY OF SRI LANKA

BACHELOR OF TECHNOLOGY – LEVEL 04

FINAL EXAMINATION– 2015

MPJ4131 – HISTORY OF TECHNOLOGY

DURATION – THREE (03) HOURS

OPEN BOOK EXAMINATION (OBE)

Date: 04th August 2015 Time: 1330 – 1630 hrs

Answer any Four (04) questions only.

01. Read the following passage and the relevant session in your course material (History of Technology, Unit 01, Session 03) and answer the following questions.

Sri Lanka had an efficient hydraulic civilization for a period of over thousand years from 200 BC till 1200 AD. Out of its 103 drainage basins, those underneath in the dry zone were successfully irrigated through a system of tanks and diversion canals. Socio-technical aspects of water management seem efficient and well performed in the construction and maintenance of these tank and canal systems. It is believed that the King and the regional chieftains performed a very strong and tight management. In addition strategic use of both top-down and bottom-up initiatives as well as private partnerships with their own tanks and maintenance systems were supported for the efficient maintenance and management.

It may have started as strong directives from the King, while officials had participated in making his directives materialized. Parallel to this, the farmers themselves may have organized is some form within the hamlets (small villages) to absorb the routine as directed by the King. Therefore we can conclude that this efficiency may have resulted from collective 'top-down' mandate and 'bottom-up' initiatives.

The religious, ethical and moral aspects interwoven with the ancient hydraulic civilization were the basis for maintenance and management of the hydraulic systems and subsequent upheaval in the society.

Moreover, the ancient hydraulic systems in the dry zone must have been technically planned with time tested remodeling activities for period of more than thousand years. In this sense the hydraulic system gradually evolved rather than being put in as an externally conceived, untested system.

i. Explain briefly the roles performed by the King, regional chieftains and the farmers in the construction and maintenance of the tanks and canal systems.

ii. Explain briefly how land and water were utilized in a sustainable manner by the ancient dry-zone farmer families in paddy cultivation and chenna cultivation respectively.

iii. According to the passage given above, write three (03) characteristic (salient) features of the ancient hydraulic civilization which lasted for more than thousand years.

02. i. What was the special features of the iron smelting technology that was practiced in the hill country of Sri Lanka. Explain briefly how those furnaces were operated.

ii. What were the factors that made hill country more attractive for iron smelting?

iii. Why do you think this ancient practice was abandoned by people in the hill country? Discuss three possible reasons.

03. Read the following passage and the relevant session in your course material (History of Technology, Unit 02, Supplementary Reading Material, Appendix 01) and answer the questions given below.

Joseph Needham in his major work "Science and Civilization in China" offers a vision of the amazing range of sophistication of the sciences and technologies developed in China before their independent development was stifled (suppressed) by the impact of Europe from the 15th century A.D. onwards. Needham also gives a list of the discoveries, inventions and concepts which traveled from China to Europe and had a seminal influence in precipitating the scientific revolution in Europe. According to Francis Bacon, the three most important inventions namely printing, gunpowder and magnetic compass that transmitted from China to Europe changed the whole face and state of things throughout the world.

In Europe, nature has always been thought of as being governed by laws laid down by an external God. The primary urge in Bacon was to find a method of deciphering (revealing) these divine laws, and then playing God with nature and man. For the Chinese, however, there never was any celestial lawgiver, issuing commands to nature. Nature was self-governed, unfolding itself according to its

own internal harmonies. The object of science for the Chinese therefore was not to decipher (reveal) the laws in order to put nature to human uses, but to find out the way of nature.

i. Explain briefly how the three (03) most important inventions transmitted from China to Europe changed the whole face and state of things throughout the world.

ii. What were the factors that led to the invention of printing by the ancient Chinese before any other nation?

iii. According to the passage given above, compare and contrast the world views of the Europeans and the Chinese respectively in dealing with the nature.

04. Write a 3 page summary highlighting the contributions made by people of the ancient lands of Islam, ranging from Spain and Morocco to Eastern Asia, to the development of the fields of engineering (eg. Irrigation, Dams, Water raising machines etc.).

05. a) Explain briefly the contributions made by the following Indian Mathematicians (Give specific examples from Arithmetic and Algebra)

i. Aryabhatta
ii. Brahmaguptha

b) Compare and contrast the approaches of the Indian Mathematician Bhaskara (about 1150 AD) and the Italian Mathematician Lagrange (about 1760 AD) in solving the Pellian equation $Cx^2 + 1 = y^2$ C where x and y are integers, $x, y \neq 0$ and C is a given non-square integer.

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