



CEX7111 - Construction Plant Management & Construction Safety

FINAL EXAMINATION - 2015/2016

Time Allowed: Three Hours

Date: 2016 - 12 - 09 (Friday)

Time: 0930 - 1230 hrs

Answer Four (04) questions with at least one (01) from Section B.

Section A: Construction Plant Management

Q1.

i.) "Though extensively employed in construction operations in a global scale, mechanized construction still has more disadvantages than advantages as opposed to manual construction in the context of Sri Lanka." Critically discuss the above statement, finally stating whether you are in agreement or disagreement with it.

(08 Marks)

ii.) With reference to construction project execution, describe the *four (04)* main areas under which activities of **Management** can be categorized.

(08 Marks)

iii.) As one of the main accepted classifications for construction equipment, CIB Committee on Mechanization in building has proposed a classification for construction machinery and equipment consisting of *nine (09)* major categories. Name these categories with short explanations.

(09 Marks)

Q2.

i.) For construction projects involving large earthworks such as dam building and road works Scrapers are generally used for cutting and moving boulder less soils. Describe *three (03)* major considerations under which Scrapers could be classified.

(08 Marks)

ii.) Describe the **Power Train** in detail, of an **Articulated Motor Grader** of 2.0 m mould board with **twin tandem driven axels at rear and power shift transmission**. In your description clearly distinguish the **hydraulic power flow and mechanical power flow**.

(08 Marks)

iii.) Articulated front-end loaders are popular in quarries where granular materials from stockpiles are loaded into transporters. Develop an equation for calculating the production rate of an articulated front-end loader serving a truck from a stockpile using V shape loading. You should use the physical characteristics/dimensions of the machine, positioning/changing times, speed of the machine, etc., to develop this equation.

(09 Marks)

Q3.

i.) Mobile construction machinery with a basic power plant in the form of a diesel engine, invariable use a mechanism known as a "Torque converter" to couple the engine to the traction drive. Describe the need and the operating principle of a torque converter in this type of a setup.

(08 Marks)

ii.) In the aspects of construction plant and equipment maintenance "Preventive Maintenance" is generally hailed as more economical, productive and superior to other maintenance approaches. Describe preventive maintenance in detail.

(08 Marks)



- iii.) For the purpose of recording the effective and productive utilization of the construction equipment, an indicator known as a 'Hour Meter' is a standard item in most of the machines. Describe the ingenious function of this very simple instrument in its ability to quantify the measure of energy expended by the machine.

(09 Marks)

Q4.

- i.) Two of the most common type of excavators are the 'Hoe' (Shovel) and 'Back hoe'. Discuss the characteristics of these two types of machines and identify with justifications the most suited type of these two for excavation at ground level (Opencast mining)

(08 Marks)

- ii.) Discuss the need to depreciate construction plant and *three (03)* possible mathematical methods to apply depreciation. With reasoning propose the most suited of these three methods to depreciate newly acquired construction plant.

(08 Marks)

- iii.) Describe the two major cost components of a construction plant and the most common subdivisions of these components as applicable to construction plant and explain how hourly rate for a plant could be derived based on these cost components.

(09 Marks)

Section B Construction Safety and First Aid

Q5.

- i.) Through a discussion on universally accepted main causes for accidents at worksites, highlight similar as well as different scenarios prevalent with reference to conditions in Sri Lankan **building construction** sites, which are known to exhibit accident rates above global average.

(08 Marks)

- ii.) For construction contracts in this country, it is generally a requirement for the contractor to obtain relevant **insurance** for the construction site, the cost for which is eventually channelled to the client. Discuss how this cost could be justified.

(08 Marks)

- iii.) Describe the evolution of 'Factories Ordinance' into the present **Safety and Health Legislation of Sri Lanka** and discuss the adequacy of this legislation in dealing with present levels of technology, personal rights and compensation.

(09 Marks)

Q6.

- i.) After clearly identifying and explaining the importance of **first aid** in construction sites, describe the necessary facilities and trained personnel required at a multi span railway viaduct construction site located in a mountainous terrain, to provide first aid in the event of accidents perceivable under site conditions.

(08 Marks)

- ii.) The first aid technique known as **Cardio Pulmonary Resuscitation (CPR)** is often required to be administered on accident victims at construction sites. After relating the medically related conditions for which this technique could be used describe the steps involved in administering the CPR procedure.

(08 Marks)

- iii.) Define the medical condition known as '**shock**', enumerate *five (05)* significant signs of shock that a victim might exhibit and describe the first aid measures to be administered to a victim of shock in detail.

(09 Marks)

