

CEX3230 - CONSTRUCTION MATERIALS



FINAL EXAMINATION 2014/15

Time Allowed: Three (03) hours

Date: 2015 - 08 - 04 (Tuesday)

Time: 0930 - 1230 hrs.

The paper consists of Eight (08) questions. Answer any Five (05) questions. All questions carry equal marks. Write down your Index Number clearly on the answer script.

*If you have answered more than five questions (either partly or in full), cross out the answers. Otherwise, only the first five answers appearing in the answer book will be evaluated.*

Q1) A parapet wall is to be constructed using bricks and a cement mortar mix of 1:6 and water cement ratio of 0.3. Assume that you have been appointed as the technical officer and given the task of supervision of wall construction:

1. Explain how you would inspect a load of bricks purchased from a dealer. Give characteristics of good quality bricks and defects that should be inspected. (4 marks)
2. Discuss relative advantages and disadvantages of bricks as compared with cement concrete blocks. (4 marks)
3. Identify role of cement and sand in the mortar mix. (4 marks)
4. Describe how you would supervise the mortar mixing at site by hand mixing. (4 marks)
5. State fresh state properties of cement mortar. (4 marks)

Q2) Jack wood has to be sawn to make rafters, window and door sashes and frames of a dwelling house. The ceiling is to be composed of chip boards.

1. Draw diagrammatically the various commercially adopted sawing methods of timber in Sri Lanka. (4 marks)
2. Out of the methods drawn, indicate the best method of sawing timber to be used in structural applications explaining the reason. (4 marks)
3. List the basic steps that would transform Mahogany wood log to a painted window frame. Include various steps involved in painting as well. (4 marks)
4. Describe factors that lead to decay of timber. (4 marks)
5. Discuss advantages and disadvantages of cladding the ceiling with chip boards instead of asbestos ceiling sheets. (4 marks)



Q3) A temporary shed for storing of cement and other accessories and a temporary sanitary facility need to be erected at a construction site.

1. Describe the suitable materials/ methods that you would adopt to erect the temporary shed at low cost. (4 marks)
2. Propose a suitable type of roofing material to be used in the shed and the functional requirement that should be satisfied by the proposed material. (4 marks)
3. Describe the precautions that you would take in storing cement inside the shed. (4 marks)
4. Suggest a suitable flooring tile for the sanitary facility and three reasons for your selection. (4 marks)
5. Suggest a suitable material for the door of the sanitary facility giving three reasons for your selection. (4 marks)

Q4) A new concrete dam is to be constructed across Kelani river in the Kalutara district.

1. Propose a suitable type of cement that should be used in the construction of the dam stating the reasons of your selection. (4 marks)
2. Give separately the hardened state properties and fresh properties of concrete. (4 marks)
3. A slump of 50mm is recommended for the above concrete mix. Explain the usefulness of slump and the procedure of slump test. (4 marks)
4. Mix proportions of ingredients for concrete may be either by volume or weight. Discuss the relative advantages and disadvantages of these two methods. (4 marks)
5. Assuming that Tor steel is used in reinforcing the dam list out the properties of Tor steel. (4 marks)

Q5)

Tar, Bitumen and Asphalts are widely used in the field of civil engineering in damp proofing buildings, water proofing roofs, painting timber and steel and for constructing roads.

1. State the differences between Tar, Bitumen and Asphalt. (4 marks)
2. Give a description of fillers used in road works and their functions in a mix. (4 marks)

Paints are required mainly to protect metal work, timber work and walls and secondarily for a decorative effect.

1. State four usual defects in paint. (4 marks)
2. Describe the preparatory work done before repainting an old wooden window sash. (4 marks)
3. List out the various steps in the preparation of a paint. (4 marks)



Q6)

Aluminium and its alloys possess certain properties that make them effective in using in the building construction industry.

1. Give an application of Aluminium in the building construction industry and four desirable properties identified in selecting Aluminium for the said application. (4 marks)
2. Identify four desirable properties obtained by alloying Aluminium with Silicon. (4 marks)

Plastic materials (UPVC, Polythene, and Polybutelene) are now widely used in manufacturing rainwater goods and pipe line industry and have largely superseded materials like lined metal and ceramic.

1. Comment on the above statement. (4 marks)
2. Briefly describe the manufacturing process of PVC in the industry. (4 marks)
3. Describe the factors that cause deterioration of PVC. (4 marks)

Q7) Use of polymer adhesives offers many advantages over binding techniques such as sewing, mechanical fastening, thermal bonding etc.

1. List out three advantages of polymer adhesives over other binding techniques. (4 marks)
2. Explain what hot melt adhesives are and give two applications of hot melt adhesives. (4 marks)
3. Compare properties of thermosetting and hot melt adhesives. (4 marks)
4. Explain the role of polymer coatings on wooden surfaces. (4 marks)
5. What type of polymer coatings would be suitable for protection of buildings and structural units? (4 marks)

Q8) Geotextiles can be used effectively as a wind break to prevent/ reduce wind erosion.

1. Describe briefly what a geotextile is. (4 marks)
2. Explain the characteristics of geotextiles that make them suitable as reinforcement applications. (4 marks)
3. Explain the role of geotextiles in wind erosion control. (4 marks)
4. Draw a diagram of a fabric wind break installed to protect land by wind erosion. (4 marks)
5. List three types of natural geotextiles. (4 marks)

