Study Guide

Module 405 – Level 4

Non-Convertible Media

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Summary

In this Intermediate Level Module, naturally occurring and synthetic media are covered in some detail.

After a discussion of the various film-forming processes of non-convertible naturally based media ranging from shellac, nitrocellulose, plastisols and bitumens their properties and typical uses are outlined.

The synthetic media described in this Module include acrylics, vinyl copolymer resins and emulsions.

Structure of the Module

The module training material consists of 2 sections, 1 set of Self - Assessed Questions (SAQ), 1 Computer Marked Assessment Questions (CMA), 2 Assignments (ASG), and an end test (TMA)

The module is designed to take about 6 hours of study. This excludes the time taken to write up the ASG'S.

Self- Assessment Questions (SAQ)

Are designed to enable you to check your own progress. Questions are asked as you progress through the module. You should write down your answers and then check them against the answers given in the Appendices. No marks are awarded for SAQs.

Computer Marked Assessment Questions (CMA)

Are a multi- choice question set that tests your understanding of the module. Please carry out this test before you submit any other work for marking by your tutor. These are completed online, you will need to log onto your study portal and then follow the CMA link/ instructions.

Assignment (ASG)

The ASG are an exercise in which the student research into and reports on certain objectives. You can discuss your proposed assignment with your tutor and mentor before commencing work. You will need to write a report on the assignment, which is then sent to your tutor for marking. Please see further instructions included in the Appendix on ASG Guidance Notes. Please note that there are 2 ASG's in this module

Tutor Marked Assessment (TMA)

Is a mandatory end test question paper taken under 'closed books', fully invigilated exam conditions. These are normally held on- site with an invigilator in attendance, which is normally your workplace

mentor. The student or mentor will contact Lorraine Beard, and she will arrange for the TMA and instructions to be sent, by email to the chosen invigilator, and then this is then given to the student on the day and time that has been chosen.

Marks for the module

CMA	20%
ASG	35%
TMA	45%
	100%

An overall mark of 50% or more is necessary for successful completion of the module, with students achieving at least 40% of the marks available in each element. In addition, an overall mark of 50% - 64% must be achieved for a PASS to be awarded, an overall mark of 65% - 84% must be achieved for a Merit and over 85% for a Distinction.

Module Pre-requisites

These modules include references to scientific concepts relating to coatings technology. For example, those identified with an asterisk contain many references to chemical formulae and reactions. Therefore, it is a requirement that you have a scientific education, with Chemistry and Physics to at least UK Advanced Level or higher, of which you can provide evidence.

Overview of qualification levels

Persons taking these modules should be employed or have recently been employed in the coatings or a related industry.

Most intermediate students will have studied some modules at foundation level. However, students who have not studied modules at foundation level but have a scientific background and experience of the coatings industry should be able to benefit from this module.

Successful completion of six modules, including at least four at level 4 entitles a student to a full, Level 4 International Certificate in Coatings Technology (ICCT), awarded by The Coatings Training Institute. However, individual certificates are also presented if the student chooses to take less than six modules.

Persons taking modules at Intermediate Level should be employed or have recently been employed in the coatings or a related industry. They should have studied some science and chemistry.

Module Objectives

When you have finalised this module, you should be able to do the following:

Section 1 – Non-Convertible Media - Naturally Occurring

Objectives

1.1 Film-forming processes of non - convertible media

1.2 Describe shellac as the simplest example of a lacquer material and name two other examples of `spirit soluble' resins

1.3 Given a diagram of the cellulose molecule, identify the functional group present and state two reasons for the unsuitability of cellulose as a film former and recognise the existence of other cellulose derivatives

1.4 Describe the two modifications necessary to produce usable film formers from cellulose, using cellulose nitrate as an example, and account for the existence of a number of grades of such film formers

1.5 Describe in outline the properties of cellulose nitrate, with special reference to its high flammability

1.6 Describe the use of resins to raise the application solids of cellulose nitrate lacquers. Explain that cellulose (plus hard resin) films lack extensibility and impact resistance and require the addition of a plasticiser

1.7 Give examples of typical uses of cellulose nitrate lacquers

1.8 State the special characteristics of chlorinated rubber and list typical uses for coatings based on chlorinated rubber

1.9 Describe in outline the properties of bituminous media and list typical applications for coatings based on bituminous media

Section 2 - Non-Convertible Media - Synthetic

Objectives

2.1 Explain the terms homopolymer and copolymer as applied to synthetic addition polymers

2.2 Describe thermoplastic acrylic resins and give examples of typical uses of thermoplastic acrylic lacquers

2.3 Describe thermoplastic vinyl resins as copolymers of vinyl chloride and vinyl acetate

2.4 Give reasons, with respect to 2.3 above, for the inclusion of the comonomer, vinyl acetate, in terms of its effect on:

a) solubility characteristics

b) adhesion

2.5 State the properties of vinyl chloride copolymers

2.6 Explain the properties of polymer emulsions in terms of high molecular weight and small particle size and give the principal uses of polymer emulsions