2013

COLOUR SCIENCE

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

i) Subtractive primaries of colour mixing are

a) Red, green and blue

b) Red, yellow and blue

c) Red, yellow and green

d) Purple, yellow and cyan.

ii) The number of unique hues in Munsell system is

a) three b) four

c) five d) six.

iii) When two colours have same tristimulus values the colours will look

a) alike under certain conditions

b) always alike

c) not necessarily alike

d) never alike.

iv) Which one of the following colour scales is visually uniform ?

a) X, Y, Z b) Y, x, y

c) L^*, a^*, b^* d) none of these.

v) Which one of the following are the psychometric parameters ?

a) X, Y, Z values b) Y, x, y values

c) L^*, a^*, b^* values d) L^*, C^*, h values.

vi) Which one of the following is additive function ?

a) Reflectance b) Transmittance

c) Optical density d) Scattering.

vii) The colour temperatures of tungsten lamps as against fluorescent lamps are

a) higher b) lower

c) similar d) not related.

viii) For colour measurement of fluorescent sample the instrument should be based on

a) Direct optics b) Reverse optics

c) Bidirectional geometry d) Diffuse geometry.

ix) Colour matching functions and standard observer functions are

a) related to quantities of primary colours

b) related to energy of light sources

c) related to reflectance of objects

d) not related.

x) Which one of the following is not a colour difference equation ?

a) CIELUV b) Kubelka-Munk

c) CMC (l :c) d) CIE 2000.

GROUP – B

(Short Answer Type Questions)

Write short notes on any *three* of the following.

$3 \times 5 = 15$

2. Light sources and illuminants.

3. Beer's and Lambert's law.

4. Munsell Colour Order System.

5. Metamerism.

6. Merits and demerits of tristimulus colorimetry.

7. Colour matching functions.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. What are the relations between colour and chemical constitution of colouring matters ? Describe chromophores, auxochromes and solubilising groups present in organic dyes. What are the fastness properties a dyestuff should have for being suitable for application on textile materials ?

9. Describe with examples the additive and the subtractive mixing of colour. Describe the primary and secondary colours in these two types of mixing. How are they correlated. How are standard observer functions derived ?

10. What are colour order systems ? Describe desert island experiment briefly. Describe a popular colour order system.

11. What are meant by tristinulus values ? How are these calculated from reflectance data ? Describe chromaticity diagram, dominant wavelength and excitation purity.

12. Why measurement of colour difference is more important than the measurement of actual colour in textile and other colouration industries ? Name a few existing colour difference formulae. Describe one colour difference formula based on surface-mode colour discrimination data.

13. What are the advantages of computer colour matching ?

State the basic principle of colour matching program.

Describe the flow sheet of matching program briefly.