

ORDINARY LEVEL PHYSICS

FORM III

MARKING GUIDE

DISPERSION AND COLOUR

SECTION A [16 marks]

01.

I	II	III	IV	V	VI	VII	VIII	IX	X
E	D	C	A	C	C	B	A	C	E

10 marks

02.

I	II	III	IV	V	VI
C	D	F	E	B	A

06 marks

SECTION B [54 marks]

03.

i) A - CYAN

B - YELLOW

C - MAGENTA

D - WHITE

04 marks

ii) COMPLEMENTARY COLOURS

2.5 marks

iii) WHITE

2.5 marks

04. (a) light spectrum is a band of light waves of different frequency (and colour) obtained when light is dispersed while dispersion of light is the spreading out of the different waves in white light that occurs when light travels from a dense medium to a light one.

04 marks

(b) When white light enters an equilateral glass prism, light bends towards the normal since the glass prism is denser than air. But the different waves that make up white light are bent at different reflected angles with the waves length.

As a result, when the waves emerge from the other side of prism they are dispersed in a such a manner that light of shorter wavelength violet is closer to the bottom side of the prism. 05 marks

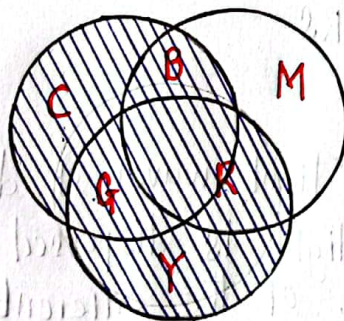
05. (a) An image is formed when regular reflection of light takes place. Due to the roughness of the surface of newspaper, diffused reflections take place from it for this reason we do not see even a faint image. 03 marks

(b) Factors on which the angle of deviation produced by a prism depends;

- > Angle of prism.
- > Refractive index of the prism.
- > Wavelength of light used.
- > Angle of incidence.

@1.5 marks.

06. From the following combination.



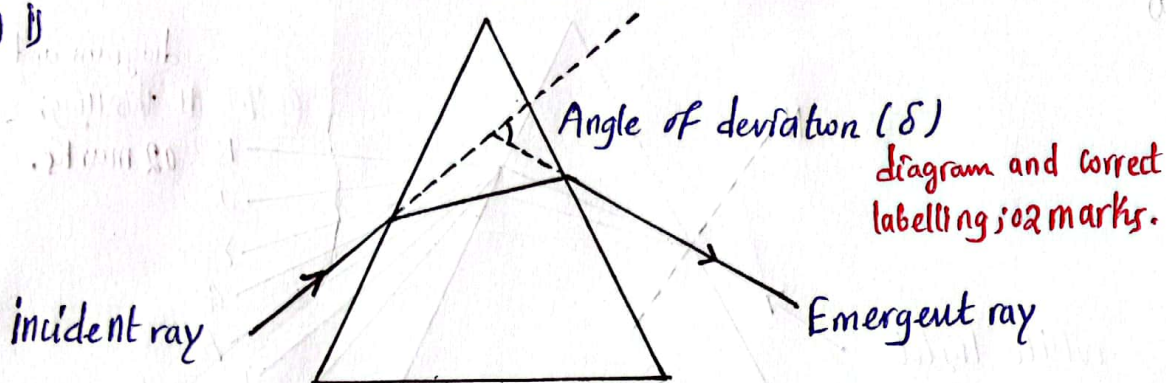
$$C + Y = G$$

04 marks

01 marks

∴ The colour added is yellow to make a flag appear pure green because paint absorb most of the light and reflect back only the wavelength that defines the colour you see. 04 marks

07. (a) i)



The angle of deviation is the angle formed by the intersection of the incident ray and the emergent ray in prism. 01 mark

(b) i) Differences between additive theory of light and subtractive

Additive theory of light.	Subtractive theory of light.
It deals with mixing of coloured lights.	It deals with mixing of colour pigments or paints.
It is based on the fact that a mixture of two lights will show all the lights in it.	It is based on the fact that if two pigments are mixed, the resulting pigment will absorb or subtract all frequencies that any of the pigment used to absorb.

@1.5 marks

ii) Primary colour (in additive theory)

Red, green and blue lights are colours from which all other colour can be generated. 1.5 marks

Complementary colour are any two colour of light which add together to produce white light. Example; Magenta and green, yellow and blue and cyan and red. 1.5 marks

08. (a)

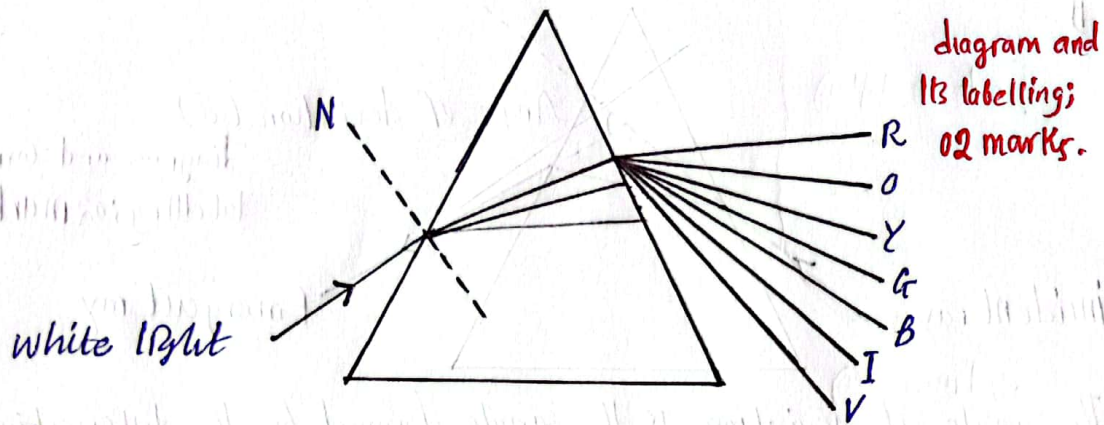


Diagram and
its labelling;
02 marks.

When white light enters an equilateral glass prism, light bends towards the normal since the glass prism is denser than air. But the different waves that make up the white light are bent at different angles.

02 marks

Shorter wavelength bent more than those of longer wavelength as a result, when the waves emerge from the other side of the prism they are dispersed in such a manner that light of shorter wavelength (violet) is closer to the bottom side of the prism.

02 marks

(b) Primary colours of light are the colours that can not be obtained by mixing other colours. There are red, green and blue.

1.5 marks

Complementary colours are the colours obtained by mixing two primary colours. There are cyan, magenta and yellow.

1.5 marks

SECTION C [30 marks]

09. (a) 25°

(b) 35°

(c) 60°

(d) 40°

@ 3.75 marks

10. (a) White light.

(b) White light.

@ 7.5 marks.

11. (a) Cyan pigment will be obtained.

(b) It will appear in a red colour.

(c) Red colour will be seen.

@ 05 marks.