

Name of the Student: _____

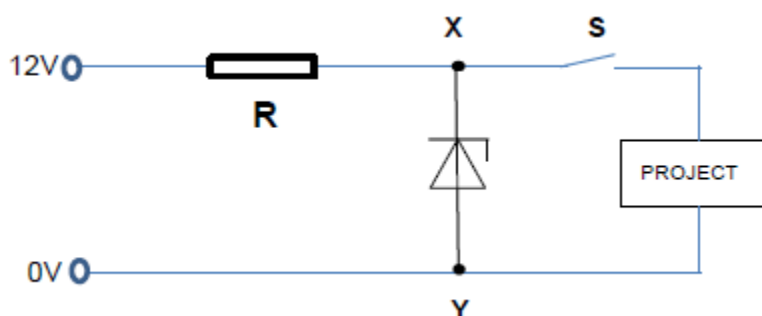
Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

(a)



1 mark for Zener symbol

1 mark for orientation

2

(b) (i) $80\text{mA} + 5\text{mA} = 85\text{mA}$

Answer - 1

1

(ii) $12\text{V} - 5.1\text{V} = 6.9\text{V}$

Calculation and answer - 1

1

(iii) $R = 6.9\text{V} / 85\text{mA} = 81\Omega$

Calculation and answer - 2

2

(c) (i) $P = V^2 / R_P = (6.9 \times 6.9) / 75 = 0.64\text{W}$

Hence P is approx. 0.6W

Calculation and answer - 2

2

(ii) $I = V / R \quad I = 6.9 / 75 \quad I = 92\text{mA}$

Calculation and answer - 2

2

[10]

Q2.

(a) (i) Log graph enables a wide range of values to be displayed on the same axis.

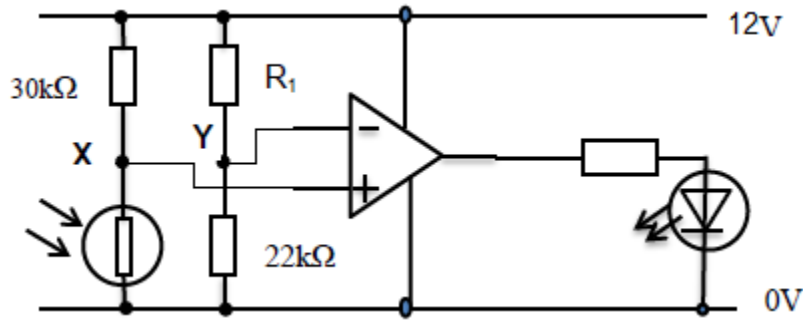
Allow - (enables values to be displayed as straight line)

1

(ii) 7 lux

1

(b)



1 mark for connections correct way round

1

(c) (i) $60 \text{ k}\Omega / (60 \text{ k}\Omega + 30 \text{ k}\Omega) \times 12 \text{ V} = 8 \text{ V}$

Working - 1

Answer - 1

2

(ii) $R_1 = 11 \text{ k}\Omega$ to give same value at Y as switching voltage at X (2:1 ratio) (No ecf on value)

Reason / calculation - 1

Answer - 1

2

(d) The op-amp is not ideal and will saturate above 0V

Saturation - 1

Need to drop voltage

Voltage drop - 1

Acceptable method

Method - 1

3

(Total 10 marks)