

2003 HIGHER SCHOOL CERTIFICATE EXAMINATION
Engineering Studies

Section II (continued)

Marks

Question 16 — Telecommunication (15 marks)

- (a) (i) The telecommunications industry uses copper and fibre optics for transmission of data. State a different application for each of these materials, and explain, in terms of their properties, why they are used for this application. 4

Copper can be used for corrosion resistant coatings to make materials corrosion resistant with a more reactive metal.

Fibre optics are used for entertainment or decorations due to the different colour lights in the optic fibre is a creative design.

- (ii) Cold drawing is used to form copper into electrical wire. Describe TWO problems associated with the use of the process. Describe a subsequent process that will reduce these problems. 3

Cold drawing ~~increases~~ creates distorted and elongated grain structure which increases stresses in the copper which could cause cracks or other deformities ~~and reduce the life of electricity~~ and could fail.

There is also high stress on the machinery due to the cold process which could damage machinery.

Extrusion ~~is~~ (hot working) ~~doesn't~~ the ~~metal~~ hot metal is forced through a die that forms it into

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a long thin wire with the assistance of a ram

Question 16 (continued)

- (b) Identify TWO technological changes in the telecommunications industry. Discuss the effects that these changes have had on society. 4

..... Wireless communication – allowing more ease and free in communicating also over large distances, such as with mobile phones. Wireless internet allows ~~data transfer~~ access anywhere to information, ~~again~~ again easy access for user. ~~to~~

~~Microchips and microprocessor~~

..... Computer systems and components reducing in size, allowing mobile phones, computers and any other data system to be smaller ∴ can take it anywhere with ease increasing popularity and use of telecommunication devices could speed up development.

- (c) (i) Describe the transmission of data from a mobile phone to another mobile phone. 2

..... The mobile phone sends a signal to the nearest network tower which puts that signal on another frequency or signal as the carrier wave and that is sent to the other mobile phone where it is received.

- (ii) Explain the effect that mobile phone communications may have on other electronic systems. State TWO situations where this effect could endanger lives. 2

..... The signals that are given off can interfere with other electrical devices such as those on planes which can disrupt controls and endanger everyone on board.

..... Also the radiation or signals from mobiles being ~~at close to~~ the ear can interfere with electric signals in the brain which could cause brain damage.

End of Question 16