

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 - connection plates in switches due to their low current resistance to electricity

Fibre optics - glass fibre \Rightarrow fibre glass protective coverings, light and water proof, able to be shaped to any design, does not break down easily in atmosphere

- (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

• The wire is hard and brittle and will break easily due to ~~flex~~ to flexibility
• Electrical conductivity decreases due to cold working process
→ Wire should be hot drawn or due to recrystallisation the wire will be ^{greater} electrical conductivity and ductile

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Question 16 (continued)

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

• Conversion from Analogue to digital in most appliances has enabled larger amount of information to flow, larger bandwidths \therefore e.g. greater capacity to handle mobile phone calls

• Technological advances have enabled systems to be smaller and \therefore multi-tasked items can be produced such as:- GPS tracking, mobile phone, and web access in an unit ~~of~~

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

The transmission from the mobile phone (micro waves), are received by the nearest reception tower which by fibre optic or satellite shall transfer the signal to the corresponding tower & phone user.
digitally

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

through transmission signals ~~to~~ at the mobile phone it may interrupt the operation of other appliances. E.g. Controls of an aeroplane and their ~~ftd~~ failure also hospital equipment which may be keeping someone alive.

End of Question 16