

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 earthing poles to prevent power surges damaging equipment. Reasons:
↳ low electrical resistance
↳ fairly low reactivity - take a long time to corrode

Fibre optics can be used for getting light into hard to reach places → accurate transmission of light
→ flexibility

- (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

High forces involved in cold drawing, Hot drawing would reduce forces needed

Wires may come out stiff and brittle, normalizing would make the wires more flexible again.

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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.

Fibre optics - the invention of fibre optics have reduce time needed to communicate data between people and have lowered the maintenance

needed on communication systems.

Satellite technology - permits people to communicate across massive distances. Reducing the "distance" between different countries.

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

The analogue voice sound is encoded into a digital signal which is sent ^(by radio waves) to a radio tower, amplified and then transmitted to the other telephone, decoded back into an audible sound

and played through the speaker

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

Mobile telephone emit electro magnetic radiation which can interfere with equipment by confusing their signal with it's own internal signal, if a life support machine malfunctioned, or a vital radio system (e.g. police radios) became inoperative, lives could be endangered

End of Question 16.