2003 HIGHER SCHOOL CERTIFICATE EXAMINATION Engineering Studies

Section II (continued)

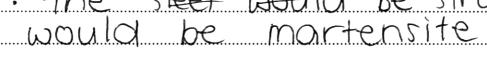
Marks

Question 13 — Personal and Public Transport (10 marks)

A railway track has rails made of 0.8% carbon steel.

(a) The surface of the rails has been induction heated and water quenched. Describe the final structure and properties of the rail.

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steel would be - Hard ver scratch resistant and brittle

(b) A suburban train weighing 400 tonnes has to climb a gradient of 1 in 50 at a constant velocity of 60 km per hour.

If the power required to overcome rolling resistance at this velocity is 450 kW, calculate the overall power needed to climb the gradient.

450 KW

Power = 7500 KW

Question 13 continues on page 16

(c) (i) Describe how an electric motor is used to convert electricity into rotary
motion.
an electro motive fore is put in
a coil of wire this wire is
in a mangetic field. When the
is a voltage carring loop in a
magnetic field a torque is
induced this torque turns the
(ii) Describe TWO different applications of electrical motors that are used in .
transport systems.
· Used to spin asomething
that transports people
eq Elevator, Lift
. & Can be used in smaller
motor vechicles to replace a
petrol motor
eg. Gold Byggies
End of Question 13 \int_{0}^{∞}