

**INSTITUTION OF RAILWAY SIGNAL ENGINEERS
2009 EXAMINATION**

MODULE 2 - SIGNALLING THE LAYOUT

TIME ALLOWED - 1 1/2 HOURS

THIS PAPER SHOULD BE TREATED ON THE BASIS OF POWER SIGNALLING IN ACCORDANCE WITH THE PRACTICE WITH WHICH YOU ARE MOST FAMILIAR

ANSWER SHEETS WILL BE PHOTOCOPIED – PLEASE USE ONLY BLACK INK

CANDIDATES SHOULD ANSWER EITHER

PART A (Main Line Practice)

OR

PART B (Rapid Transit Practice)

Paper continued on next page

PART A – TO BE ANSWERED IF USING LAYOUT 1 (Main Line Practice)

ALL FOUR QUESTIONS SHOULD BE ATTEMPTED AND CARRY MARKS AS SHOWN

Question 1

- a) Determine the minimum braking distances for the permissible speeds and braking characteristics of the traffic specified on layout 1.
- b) Determine graphically or by calculation the theoretical best headway (without any allowances) at minimum signal spacing and the given speed for application on layout 1 for:
 - i) a fast passenger train following another fast passenger train
 - and
 - ii) a fast passenger train following a stopping passenger train.

Explain how the results of the headway calculation determines your choice of signalling system.

[20 Marks]

Question 2

Signal layout 1 in accordance with the notes thereon, numbering the signals (or equivalent) and defining all routes.

[60 Marks]

Question 3

Number all power worked points and indicate their 'normal' position. Add any trap points necessary. Identify hand worked or ground operated points as such.

[10 Marks]

Question 4

Mark the limits of all train detection equipment and identify each in sequence.

[10 Marks]

END OF PART A

Paper continued on next page

PART B – TO BE ANSWERED IF USING LAYOUT 2 (Rapid Transit Practice)

ALL FOUR QUESTIONS SHOULD BE ATTEMPTED AND CARRY MARKS AS SHOWN

Question 1

Determine theoretically, either by calculation or graphically, appropriate signal spacings for the braking characteristics and the intensity of traffic on offer. All calculations and graphs must be shown. Include a brief definition of the signalling arrangements and associated systems used, which must include a form of train protection.

[35 Marks]

Question 2

Signal layout 2 in accordance with the notes thereon, numbering the signals (or equivalent) and defining all routes.

[45 Marks]

Question 3

Number all power worked points and indicate their 'normal' position. Add any trap points necessary. Identify hand worked or ground operated points as such.

[10 Marks]

Question 4

Mark the limits of all train detection equipment and identify each in sequence.

[10 Marks]

END OF PART B

End Of Paper.