INSTITUTION OF RAILWAY SIGNAL ENGINEERS
2019 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)
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 passenger trains and freight trains using the characteristics specified on layout 1. From your calculations, determine the minimum signal spacing. [5 marks]

b) Determine the best theoretical headway for both 3 and 4 aspect signalling between A and H at uniform minimum signal spacing and a non-stop passenger train at a speed of 180 km/h. Explain how the results of these headway calculations determine your choice of signalling system. [5 marks]

Note: You should determine the position of the protecting signal on your layout before you answer part c) of this question.

c) A train, 184m in length, is given a Movement Authority (MA) to leave platform 3 at G. After ten seconds, the train commences to move. Determine graphically or by calculation the minimum time that can elapse between the MA being received and a passenger train that is approaching G arriving under an unrestricted MA and coming to a stand in platform 3. State all assumptions. [10 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 continues 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.