higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1760**(E)**(J30)T
AUGUST 2010

NATIONAL CERTIFICATE

;TH OF MATERIALS AND STRUCTURES N5

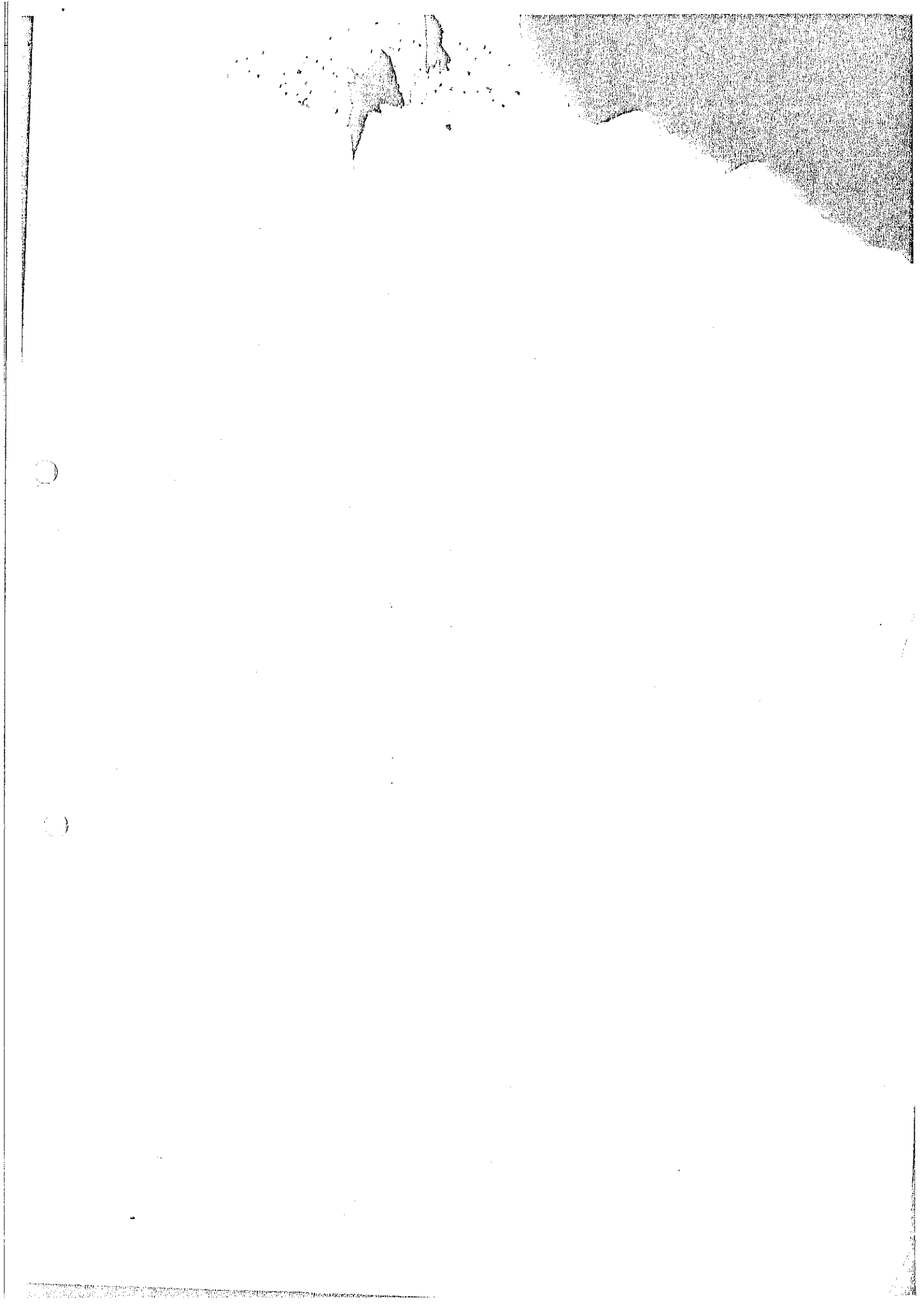
(8060065)

30 July (X-Paper)
09:00 – 12:00

REQUIREMENTS: **Hot-rolled structural steel tables BOE 8/2.**

Calculators may be used.

This question paper consists of 5 pages and 4 diagram sheets.



DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

STRENGTH OF MATERIALS AND STRUCTURES N5

TIME: 3 HOURS

MARKS: 100

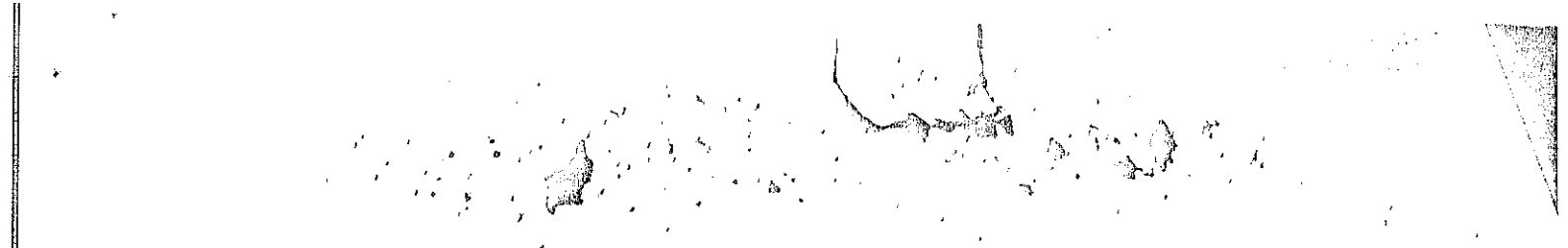
TIONS AND INFORMATION

swer ALL the questions.

d ALL the questions carefully.

mber the answers correctly according to the numbering system used in this uestion paper.

Write neatly and legibly.



QUESTION 1

Define the following terms in relation to the tensile test of mild steel:

1. 1 Proportional limit point
1. 2 Elastic limit point
1. 3 Yield point
1. 4 Maximum stress point
1. 5 Breaking point

QUESTION 2

Two steel plates, 14 mm thick, are joined by a double-riveted lap joint with riveting. The stresses are as follows:

Shear stress	= 55 MPa
Tensile stress	= 62 MPa
Crushing	= 70 MPa
Assume d	= 6,05 $\sqrt{t}$

Calculate the following:

2.1 The diameter of the rivets

2.2 The pitch for the rivets

2.3 Check if the joint is safe against crushing (5)

2.4 The joint efficiency (3)

[13]

QUESTION 3

A steel bar, 30 mm in diameter and 1,2 m long, absorbs 62 N.m of energy at its limit of proportionality, under axial loading.

Take E = 200 GPa.

Calculate the following:

3.1 The stress induced in the bar when the load is gradually applied (3)

3.2 The load when it is suddenly applied (4)

3.3 The load when it is dropped from a height of 110 mm (2)

DIAGRAM SHEET 2

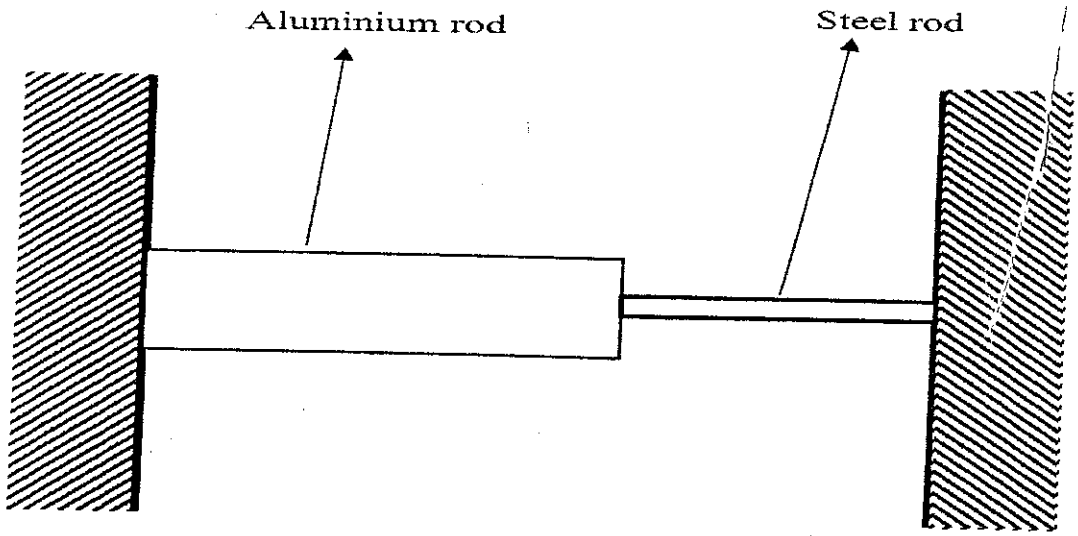


FIGURE 2

RAM SHEET 3

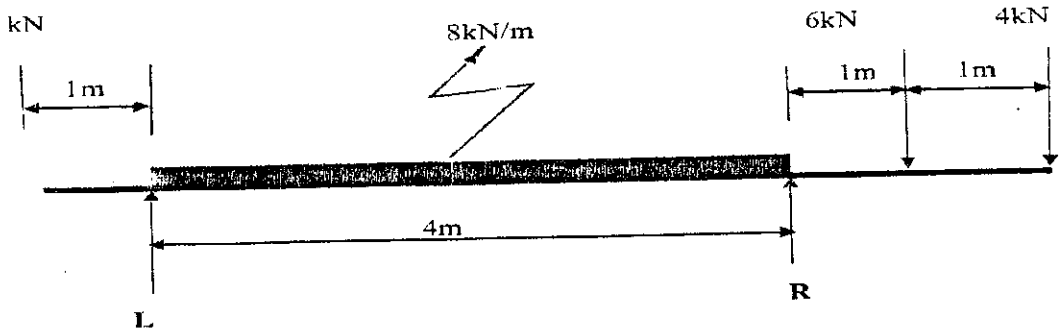


FIGURE 3