

PROGRAM : NATIONAL DIPLOMA ENGINEERING
METALLURGY

SUBJECT : **PHYSICAL METALLURGY II**
CODE : **PMY 22-2**

DATE : WINTER EXAMINATION
11 JUNE 2019

DURATION : 3 HOURS

WEIGHT : 40:60

TOTAL MARKS : 100

EXAMINER : MR L G JUGANAN

MODERATOR : MR SR SEFOKA

NUMBER OF PAGES : 3

INSTRUCTIONS : ANSWER ALL QUESTIONS.
CALCULATORS PERMITTED (ONE PER
STUDENT)

Question 1 **[10]**

Explain how you would obtain a 50% pearlite-50% ferrite microstructure in a plain C steel.

Question 2 **[15]**

Discuss polarization as it occurs in electrochemical corrosion using suitable examples.

Question 3 **[10]**

Compare and contrast ferritic and austenitic stainless steels.

Question 4 **[10]**

Use a spider diagram to show the development of a heat resisting 310 stainless steel.

Question 5 **[10]**

State the effect of alloying elements and microstructure on the DBTT in high strength BCC steel.

Question 6 **[10]**

Show how a 100% martensitic structure is obtained for SAE4340.

Question 7 **[15]**

Design a heat treatment to produce a uniform microstructure of 36% primary ferrite and balance pearlite and hardness of HRC 23 for a 1050 steel.

Question 8 **[10]**

With the aid of a sketch explain the three stages of Creep in metals as a high temperature problem.

Question 9 **[10]**

Write brief notes on heat treatment of cast irons.

TOTAL [100]