



**PROGRAM** : NATIONAL DIPLOMA  
EXTRACTION METALLURGY

**SUBJECT** : *COAL PROCESSING AND USAGE III*

**CODE** : MCUA 311

**DATE** : MAIN EXAMINATION  
13 NOVEMBER 2014

**TIME** : SESSION 2 (12:30)

**DURATION** : 3 HOURS

**WEIGHT** : 40: 60

**TOTAL MARKS** : 101

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**EXAMINER** : Mrs. N.TSHIONGO-MAKGWE

**MODERATOR** : Mr. G.M. CRESSWELL

**NUMBER OF PAGES** : 3 PAGES

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**INSTRUCTIONS** : CALCULATORS ARE PERMITTED  
ANSWER ALL QUESTIONS

**REQUIREMENTS** : 2 SHEETS OF GRAPH PAPER.

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**Question 1****[10]**

Give the difference between the following;

- 1.1 Reserves and resources. (2)
- 1.2 Precision and accuracy (2)
- 1.3 Mean and median (2)
- 1.4 Sequential and cumulative float and sink analysis. (2)
- 1.5 Coal Rank and Coal Grade (2)

**Question 2****[17]**

- 2.1 List and explain three most common production and usage stages where high pollution is experienced? (6)
- 2.2 What are the three common ways of reducing SO<sub>x</sub> emissions? (3)
- 2.3 How much SO<sub>x</sub> can be reduced by using limestone injection? (2)
- 2.4 List six causes of spontaneous combustion. (6)

**Question 3****[20]**

- 3.1 With an aid of a diagram briefly explain how a cumulative float and sink analysis is done in the laboratory. (10)
- 3.2 Discuss in brief the Gondwanaland coals under the following topics? (10)
  - 3.2.1 Vegetation
  - 3.2.2 Climate
  - 3.2.3 Degree of plant decay
  - 3.2.4 Mineral matter
  - 3.2.5 Maceral content

**QUESTION 4****[26]**

- 4.1 Calculate the concentration criterion, if the unwashed coal consists of fairly pure coal of say a density of 1.35, to be separated from lower quality coal of say density of 1.40. Also explain the meaning of your obtained results (5)
  - 4.2 With the aid of a diagram, explain the operating mechanism of a WEMCO Drum employed in a coal washing plant. (10)
  - 4.3 List the five important properties of an ideal suspension. (5)
  - 4.4 What are the main objectives of the medium recovery circuits in dense medium separation? (6)
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**QUESTION 5****[28]**

5.1 The following results were obtained on testing a dense medium separator treating 60X30 mm coal. Complete the table and draw the Partition Curve. The following ash contents were obtained on sampling and analyzing the feed, clean coal and discard. (8)

Feed 38.42%, clean coal 9.7%, and discard 39.8%.

Relative Density Interval	Clean Coal Fractional Yield %	Discard Coal Fractional Yield %
F 1.34	27.2	0
1.34 – 1.36	28.58	0.23
1.36 – 1.38	28.18	2.87
1.38 – 1.40	12.53	3.15
1.40 – 1.42	2.55	6.45
1.42 – 1.44	0.96	6.66
1.44 – 1.46	0	5.64
1.46 – 1.48	0	6.18
1.48 – 1.50	0	4.82
1.50 – 1.52	0	5.24
S 1.52	0	58.81

5.2 Determine the following :

5.2.1 d<sub>50</sub>

5.2.2 E<sub>p</sub>

5.2.3 I (6)

5.3 Define the following :

5.3.1 Partition curve (3)

5.3.2 Organic Efficiency (2)

5.3.3 Near density (3)

5.3.4 E<sub>p</sub>. And what factors affect its value? List four. (6)

**TOTAL 101**