UNIVERSITY OF JOHANNESBURG

PROGRAM	:	NATIONAL DIPLOMA EXTRACTION METALLURGY
SUBJECT	:	**MINERAL PROCESSING II**
CODE	:	**MPR 2B20**
DATE	:	SUMMER SSA EXAMINATION 2015 10 DECEMBER 2015
DURATION	:	(SESSION 3) 15:00 - 17:00
WEIGHT	:	50:50
FULL MARKS	:	65
TOTAL MARKS	:	100

EXAMINER	:	DR W NHETA
MODERATOR	:	MR M. HENDERSON
NUMBER OF PAGES	:	3

INSTRUCTIONS TO STUDENTS:

ANSWER ALL QUESTIONS.
PUT YOUR FINAL ANSWERS ON THE ANSWER SHEETS PROVIDED.
INCLUDE YOUR WORKING IN THE SCRIPT. IF NO WORKING IS SHOWN IN THE SCRIPT, NO MARKS WILL BE AWARDED
ENSURE THE ANSWER SHEETS HAVE YOUR NAME AND STUDENT NUMBER ON THEM.
ENSURE YOU HAND IN THE ANSWER SHEETS WITH YOUR SCRIPT.
USE 4 DIGITS UNLESS THE QUESTION STATES OTHERWISE.

Question 1

A conical stockpile is being built using an inclined conveyor belt that is 1.2 metres wide and running at 2.0m/sec. There is 30 000m^3 of ore to be put on the stockpile and it has an angle of repose of 32°.
When finished, the top end of the conveyor must clear the top of the stockpile by 1.5 metres. If the bottom of the conveyor is 45.79metres from the nearest edge of the stockpile,

Calculate:

1.1 The angle of inclination of the conveyor (8)

1.2 The time to build the conical stockpile in hours and minutes (7)

[15]

Question 2

USE FIVE DIGITS WHEN USING THE FEED AND PRODUCT SIZES IN CALCULATIONS AND FOUR DIGITS FOR OTHER PARTS OF THE CALCULATION

A plant has two mills, both of which are 2.5metres in diameter and 3.4metres long. They are each grinding an ore with a Bond Work Index of 16.3kwhr/t from 80% passing 8mm to 80% passing 75 microns at a rate of 50t/hr. The power consumption for each mill is 1Mw.

2.1 How much power is used to turn each mill? (6)

2.2 The plant plans to replace the two mills with a single mill that will grind 205t/hr feed from the same feed size to the same product size. If the new mill has a diameter of 3,5metres, what will be its length to the nearest metre? (6)

2.3 What will be the total power consumed by the new mill? (4)

2.4 Prove that the total power consumed / ton of ore treated using the two mills and using one mill will be the same (4)

[20]

Question 3

A thickener is fed with 400m^3/hr of pulp having a L/S ratio of 6.0:1.
The underflow has a volume of 92m^3/hr of pulp and a L/S ratio of 1:1.
The thickener can treat 1.498t/m^2/24hr

If the solids density is 2.8kg/litre,

Determine:

3.1 the diameter of the thickener to the nearest metre (3)

3.2 the mass of solids in t/hr in the thickener feed (3)

3.3 the mass of solids in t/hr going to the thickener underflow (3)

3.4 the volume of the overflow in m^3/hr (3)

3.5. the % of the water in the thickener feed going to the overflow (3)

[15]

Question 4

A drum filter is 2.5metres in diameter and 6metres long. It produces 1.74t solids/m^2/24hours. The L/S ratio in the cake is 0.087, in the filtrate 18.36 and in the feed, 1.0. The SG of the solids is 3.4kg/litre

Calculate:

4.1 the mass of solids in the feed in tons/hour (5)

4.2 the pulp density of the feed (5)

4.3 the volume of the filtrate in m^3/24 hours (5)

[15]

Total Marks 65