UNIVERSITY
OF
JOHANNESBURG

PROGRAM : NATIONAL DIPLOMA
- MINING ENGINEERING.

MODULE : S 4 MINE ENGINEERING III.

CODE : MEG 3211.

DATE : 2014 NOVEMBER 01 SATURDAY.

TIME : 1230 - 1530.

DURATION : 3 HOURS.

WEIGHT : 60 % OF FINAL ALLOCATION.

TOTAL MARKS : 100.

EXAMINER. : I WERMUTH.

MODERATOR : R ENGLISH.

NUMBER OF PAGES : Including this front cover: 4 pages.

INSTRUCTIONS - PLEASE ANSWER ALL THE QUESTIONS IN ORDER.

REQUIREMENTS : CALCULATOR.

2014 NOVEMBER 01 SATURDAY .

MEG 3211 .

BATHROOM .

THOSE EXPRESSING A NEED TO VISIT THE BATHROOM DURING OUR ASSESSMENT ,

MAY BE REQUESTED TO SURRENDER THEIR SCRIPTS AND VACATE OUR VENUE .

AN INABILITY TO RESIST THE CALL OF NATURE FOR THIS DURATION ,

COULD BE AN INDICATION THAT , PERHAPS , AN ALTERNATIVE CAREER SHOULD BE CONSIDERED .

THANK YOU .

S 4 MINE ENGINEERING III

MEG 3211.

Please propose a response to each enquiry.

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Q 1.   Power output of driving motor .   (41).

Scenario .

UnderGround Endless Rope Haulage Transport .
Distance	900 m .
Gradient	1 in 8 .
Speed	3.7 km / h .
Delivery	94 TPH Rock .
Tractive Resistance	193 N / Ton .
Mass Truck	400 kg .
Truck Load	800 kg .
Rope	
Factor of Safety	6
Ultimate Stress	1 400 MPa .
Construction	Spiral .

Q 2.   Diameter Ram in each Jack .   (20).

Scenario.

Multi – Deck sinking stage suspended in vertical shaft, on 6 falls of rope,
attached to double drum winder.
3 falls of rope per drum.
One of doubling down sheaves in headgear has its pedestals supported on pair of hydraulic jacks.

Depth wind from centre line of sheave	1 300 m.
Mass rope	4.52 kg / m.
Breaking force rope	735 KN.
Mass sheave assembly	1 000 kg.
Pressure gauge reading on each jack	18 MPa.
Mass Stage	33.8 Tons

Q 3.   Length of each head and tail rope .   (17) .

Scenario.

4 Rope Koepe friction hoist mounted in a tower above shaft.

Mass head and tail ropes   8.35 kg / m.
Mass rock   13 tons.
Mass each (skip + attachments).   23 tons.
Angle of wrap of ropes on drum   180 °.
Coefficient of friction between drum and rope   0.3.
Rock hoisted at   800 m / min.
Least possible distance in which skips brought to rest   33.9 m

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Q 4.   Supply Voltage .   (17) .

Scenario.

Vertical shaft.
Number of Cables   6 .
5 Stations.
Electrical load on each station   300 KVA.
Pump chamber at bottom station.
7 Pumps.
Each pump driven by 1.6 MW motor.

Q 5.   Mass Cage .   (8) .

Scenario.

Cage.
Loaded with 50 miners.
Travels up incline shaft.
Inclination   19 °.
Speed   450 m / min.
Maximum retardation permitted to avoid cage over running rope   4.5 m / s ^{2}
Emergency trip out on winder is evented.

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[100].