



**PROGRAM** : BACCALAREUS TECHNOLGIAE  
*ENGINEERING : CIVIL*

**SUBJECT** : **CONTRACT MANAGEMENT**

**CODE** : **CMC411**

**DATE** : WINTER SUPPLEMENTARY EXAMINATION 2015  
14 JULY 2015

**DURATION** : (SESSION 1) 11:30 – 14:00

**WEIGHT** : 40 : 60 (Year mark : Examination)

**TOTAL MARKS** : 120

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**ASSESSOR** : T.E.IOUW

**MODERATOR** : I. FERGUSON

**NUMBER OF PAGES** : 4 PAGES

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**INSTRUCTIONS**

- : All answers
- : All additional answer sheets are provided at the back of the examination question paper
- : Write name and Std. No. on additional material.
- : ONLY ONE POCKET CALCULATOR PER CANDIDATE MAY BE USED.

**REQUIREMENTS** : Closed book examination.

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**INSTRUCTIONS TO STUDENTS**

PLEASE ANSWER ALL QUESTIONS ON THE QUESTION PAPER. Place  
question paper at the back of the Examination Book.

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**EXAMINATION – 2015    Duration 2.5 hours - Total mark (100) - Closed book examination**

**Question 1 - Unit Rates - Formwork**

The requirement is to compile a unit rate (R/m<sup>3</sup>) for the casting of concrete on a Bridge deck.  
The concrete surface need to be finished off .

1. Do not allow for VAT in you final answer.
2. All prices are inclusive of VAT.
3. You will purchase 6 sets of formwork, each set will consist of 2 of portions of shutter each 12 m long and 2.5 m high,
4. Each shutter will consist of one side of the deck (say left side) and the same on the other side (Say right side)
5. In total 12 portions of formwork
6. The cost of formwork is R 360.00 per m<sup>2</sup>
7. Volume of concrete to be placed is 3240 m<sup>3</sup>
8. The cost of all the other equipment and hand tools will be R 25855.20 The price will be written off over 3240 m<sup>3</sup> of concrete. This price is also inclusive of VAT.
9. The total work force will consist of:
  - i) 1 Supervisor @ R 50.00 / hour
  - ii) 14 Helpers @ R 19.75 / hour
  - iii) 4 machine Operators @ R 25.00 / hour
  - iv) The total workforce will start to work at 07h00 each morning
10. Special Concrete mix "Pump Mix" will be used of grade 30/19 @ R 1083.00 / m<sup>3</sup> (Quick hardening concrete)
11. Cost of setting up the concrete and support equipment is R 2850.00 per each set-up. (Each day or shift)
12. Cost of pumping the concrete is @ R 10.83 / m<sup>3</sup> ( Separate machine)
13. Releasing agent needs to be applied to the shutters, before each shift.
14. The cover ratio of the releasing agent is 5 (five) m<sup>2</sup> per liter.
15. The Releasing agent cost R9.12 per liter and is supplied in 25 liter drums.
16. The proposed hours of work is from 07h00 until 17h00 each day for 5 days per week
17. During the casting process for the "Placing gang", the following is applicable:
  - i) Team consists of 2 machine Operators and 4 Helpers
  - ii) Do the placing of the concrete
18. During the finishing process the following is applicable:
  - i) Do the finishing.
  - ii) Team consists of 2 machine Operators and 4 Helpers
  - iii) The finishing team will complete each section (after the concrete have been pumped, spread and vibrated in position) approximately 2 (two) hours after the concrete placing gang.
  - iii) Area to be finished is 12.0m Long and 5.0 m Wide
19. Concrete:
  - iv) The Production Rate of the pumping of concrete can be regarded as 6 (six) m<sup>3</sup> in every 20 (twenty) minutes.
  - v) A Supervisor will be available in concreting area throughout the whole operation
  - vi) The volume of concrete to be placed is 162 (hundred and ninety eight) m<sup>3</sup> per shift
  - vii) The Concreting to the concrete deck is started at 07h30 in the morning.
  - viii) Despite an extended day the whole operation must be completed in a shift period.
  - ix) The Shuttering can be removed after 7 (seven) days. Therefore 6 sets of shutters



20. The rest of the team.

- x) The rest of the team will be used to demolish and erect the shuttering.
- xi) This team will work the same time as the concrete team. (Placing team)

**21. Required.**

- a) Do a time line of the labour. (5)
- b) Determine the total cost of the operation (20)
- c) Determine the cost per m<sup>3</sup> of the concrete placed. (5) Total (30)

**Question 2 Owning and Operating cost.**

A plant Hire Company see the need to enhance the machine fleet of the Company with a FEL (Front End Loader)

**Please use the paper provided for your answer and write your name on it and hand it in with your examination book.**

1. This machine will be used on various contracts in a mining operation.
2. These operations will be 6 days per week (No Sunday work)
3. These operations continue throughout the year with no time breaks ( Do not bring PPH in the calculation)
4. The machine will be utilized as follows:
  - i) Working time
  - ii) Service time as per the "Preventative Maintenance" program.
  - iii) Standing 15 % of time (Breakdown / Unscheduled Maintenance)
5. General information on the FEL is listed below in table format.
6. The payback period of the FEL will be 4 (five) years.
7. No residual value is applicable.
8. The applicable interest rate will be 13 % pa. See tables provided
9. The hours of the FEL have been estimated at 8.5 hours per day. (daylight hours) (Client rules).
10. The service and breakdown times need to be attended to during "daylight hours". (Client rules).
11. Insurance will be 5% of the Purchase price (Inclusive of tires) per year.
12. The anticipated economical lifetime of the machine is estimated at 12000 h
13. The residual value of the machine after 5 (five) years will be 25 %
14. The fuel price is R 17.20 per liter
15. The operator:
  - i) Rate per hour (NT) R 30.00 per hour. Rate per hour (OT) R 40.00 per hour
  - ii) Max. normal hours per week 45 (Basic Conditions of Employment Act)
  - iii) Maximum allowable overtime (OT) per week is 10 hours per week. (Basic Conditions of Employment Act)
  - iv) The operator agreed to a 30 min. lunch with no pay for lunch.
  - v) The lunch break will not count as "working hours".
  - vi) The 8.5 hours working plus the 0.5 hour lunch, represent a working day.
  - vii) The operator must receive annual leave (at full pay) at an allocation of 15 working days.
  - viii) During the leave period:
    - a) A standby operator must be hired in at a rate 15% more than the normal operator.



- b) The normal operator will not receive overtime (OT)
16. Ignore any VAT aspect out of this calculation.
17. During machine stoppages (Service of breakdowns):
- The operator will receive normal remuneration.
  - The FEL will not be replaced, but no income will be earned from the client for those days. ( NOTE: Leave this calculation to the very end)

Note: All prices in this Table R x 1000

Item	Make	Model	Price	Unscheduled Maintenance	Major Components Replace Labour included			Tyres		
				Lifespan	Duration	Freq - h	Engine	Price each	Freq hours	Duration
FEL	Cat	966	R3 200	30 % of price	4 Days	10000	R 800	R 50	4000	2 days
Major Components Replace Labour included			Preventative Maintenance Labour included			GET Labour included			Fuel Con	
Duration	Freq - h	Final Drive	Price	Freq - h	Duration	Price	Freq - h	Duration	l/h	
3 Days	7500	R 600	R 9	500	1 Day	R 8	2000	1 Day	25	

It is required from the Student to Calculate the hourly cost for:

- Owning the machine
- Operating the Machine without the operator
- The operator
- Total cost per hour

Total Marks (25)

### QUESTION 3 – CONTRACTS GENERAL

- 3.1 Name the four standard "General Conditions of Contract" mostly used in South Africa? (4)
- 3.2 Which key issues need to be addressed by the conditions of a contract? (3)
- 3.3 A project plan needs to be develop before compiling a project.  
This plan usually consists of ten aspects. Name eight of these aspects. (4)
- 3.4 Name the three main types of contracts which are based on the payment method. (3)
- 3.5 Name the five aspects influencing the promoter's choice of the type of contract. (5)
- 3.6 Name five types of documents needed during the tender award phase. (5)
- 3.7 Name the two types of specification in a contract. (2)



- 3.8** Describe in your own words the effect of a promoter trying to shorten the construction phase. (1)
- 3.9** Describe the meaning of a qualified tender submission. (2)
- 3.10** Name the main points to be covered during a "kick-off" meeting. (6)
- 3.11** When does the responsibility and liability of the site change to the contractor? (2)
- 3.12** Name the most important aspect to be controlled at the commencement of a contract. (1)
- 3.13** Discuss issues to be addressed in a variation order. (5)
- 3.14** Name a few reasons why a main contractor appoints sub-contractors. (3)
- 3.15** Describe the difference between a nominated sub-contractor and a non-nominated sub-contractor. (2)
- 3.16** Describe the process if the main contractor is in doubt about the abilities of a nominated sub-contractor. (2)

Total (50)

Table BB

20		% Residual		SUP EXAM	
Period	Interest	8			
		R 1 000 000	R 1 200 000	R 1 400 000	R 1 600 000
36		R 26 402	R 31 683	R 36 963	R 42 244
42		R 23 235	R 27 882	R 32 529	R 37 176
48		R 20 864	R 25 036	R 29 209	R 33 382
54		R 19 023	R 22 828	R 26 633	R 30 437
60		R 17 554	R 21 065	R 24 576	R 28 087
				R 31 598	R 35 109
				R 38 620	R 41 851
				R 42 131	R 45 656
				R 45 642	R 49 152
				R 53 265	R 57 070
				R 58 085	R 62 591
				R 63 366	R 66 764
				R 68 646	R 70 936
				R 73 927	R 75 109
				R 79 207	R 79 207
				R 84 488	R 83 646
				R 89 768	R 88 484
				R 95 049	R 94 846
				R 100 000	R 100 000

0		% Residual			
Period	Interest	13			
		R 1 000 000	R 1 200 000	R 1 400 000	R 1 600 000
36		R 33 694	R 40 433	R 47 172	R 53 910
42		R 29 762	R 35 715	R 41 667	R 47 619
48		R 26 827	R 32 193	R 37 558	R 42 924
54		R 24 558	R 29 469	R 34 381	R 39 292
60		R 22 753	R 27 304	R 31 854	R 36 405
				R 40 956	R 45 506
				R 49 115	R 54 027
				R 58 938	R 63 850
				R 64 386	R 69 751
				R 71 429	R 77 381
				R 80 865	R 87 604
				R 88 657	R 94 343
				R 94 343	R 101 082
				R 101 082	R 107 821
				R 107 821	R 114 559
				R 114 559	R 121 298
				R 121 298	R 128 036
				R 128 036	R 134 774
				R 134 774	R 141 512
				R 141 512	R 148 250
				R 148 250	R 154 988
				R 154 988	R 161 726
				R 161 726	R 168 464
				R 168 464	R 175 202
				R 175 202	R 181 940
				R 181 940	R 188 678
				R 188 678	R 195 416
				R 195 416	R 202 154
				R 202 154	R 208 892
				R 208 892	R 215 630
				R 215 630	R 222 368
				R 222 368	R 229 106
				R 229 106	R 235 844
				R 235 844	R 242 582
				R 242 582	R 249 320
				R 249 320	R 256 058
				R 256 058	R 262 796
				R 262 796	R 269 534
				R 269 534	R 276 272
				R 276 272	R 283 010
				R 283 010	R 289 748
				R 289 748	R 296 486
				R 296 486	R 303 224
				R 303 224	R 309 962
				R 309 962	R 316 700
				R 316 700	R 323 438
				R 323 438	R 330 176
				R 330 176	R 336 914
				R 336 914	R 343 652
				R 343 652	R 350 390
				R 350 390	R 357 128
				R 357 128	R 363 866
				R 363 866	R 370 604
				R 370 604	R 377 342
				R 377 342	R 384 080
				R 384 080	R 390 818
				R 390 818	R 397 556
				R 397 556	R 404 294
				R 404 294	R 411 032
				R 411 032	R 417 770
				R 417 770	R 424 508
				R 424 508	R 431 246
				R 431 246	R 437 984
				R 437 984	R 444 722
				R 444 722	R 451 460
				R 451 460	R 458 198
				R 458 198	R 464 936
				R 464 936	R 471 674
				R 471 674	R 478 412
				R 478 412	R 485 150
				R 485 150	R 491 888
				R 491 888	R 498 626
				R 498 626	R 505 364
				R 505 364	R 512 102
				R 512 102	R 518 840
				R 518 840	R 525 578
				R 525 578	R 532 316
				R 532 316	R 539 054
				R 539 054	R 545 792
				R 545 792	R 552 530
				R 552 530	R 559 268
				R 559 268	R 566 006
				R 566 006	R 572 744
				R 572 744	R 579 482
				R 579 482	R 586 220
				R 586 220	R 592 958
				R 592 958	R 599 696
				R 599 696	R 606 434
				R 606 434	R 613 172
				R 613 172	R 619 910
				R 619 910	R 626 648
				R 626 648	R 633 386
				R 633 386	R 640 124
				R 640 124	R 646 862
				R 646 862	R 653 600
				R 653 600	R 660 338
				R 660 338	R 667 076
				R 667 076	R 673 814
				R 673 814	R 680 552
				R 680 552	R 687 290
				R 687 290	R 694 028
				R 694 028	R 700 766
				R 700 766	R 707 504
				R 707 504	R 714 242
				R 714 242	R 720 980
				R 720 980	R 727 718
				R 727 718	R 734 456
				R 734 456	R 741 194
				R 741 194	R 747 932
				R 747 932	R 754 670
				R 754 670	R 761 408
				R 761 408	R 768 146
				R 768 146	R 774 884
				R 774 884	R 781 622
				R 781 622	R 788 360
				R 788 360	R 795 098
				R 795 098	R 801 836
				R 801 836	R 808 574
				R 808 574	R 815 312
				R 815 312	R 822 050
				R 822 050	R 828 788
				R 828 788	R 835 526
				R 835 526	R 842 264
				R 842 264	R 849 002
				R 849 002	R 855 740
				R 855 740	R 862 478
				R 862 478	R 869 216
				R 869 216	R 875 954
				R 875 954	R 882 692
				R 882 692	R 889 430
				R 889 430	R 896 168
				R 896 168	R 902 906
				R 902 906	R 909 644
				R 909 644	R 916 382
				R 916 382	R 923 120
				R 923 120	R 929 858
				R 929 858	R 936 596
				R 936 596	R 943 334
				R 943 334	R 950 072
				R 950 072	R 956 810
				R 956 810	R 963 548
				R 963 548	R 970 286
				R 970 286	R 977 024
				R 977 024	R 983 762
				R 983 762	R 990 500
				R 990 500	R 997 238
				R 997 238	R 1003 976
				R 1003 976	R 1010 714
				R 1010 714	R 1017 452
				R 1017 452	R 1024 190
				R 1024 190	R 1030 928
				R 1030 928	R 1037 666
				R 1037 666	R 1044 404
				R 1044 404	R 1051 142
				R 1051 142	R 1057 880
				R 1057 880	R 1064 618
				R 1064 618	R 1071 356
				R 1071 356	R 1078 094
				R 1078 094	R 1084 832
				R 1084 832	R 1091 570
				R 1091 570	R 1098 308
				R 1098 308	R 1105 046
				R 1105 046	R 1111 784
				R 1111 784	R 1118 522
				R 1118 522	R 1125 260
				R 1125 260	R 1132 000
				R 1132 000	R 1138 740
				R 1138 740	R 1145 480
				R 1145 480	R 1152 220
				R 1152 220	R 1158 960
				R 1158 960	R 1165 700
				R 1165 700	R 1172 440
				R 1172 440	R 1179 180
				R 1179 180	R 1185 920
				R 1185 920	R 1192 660
				R 1192 660	R 1199 400
				R 1199 400	R 1206 140
				R 1206 140	R 1212 880
				R 1212 880	R 1219 620
				R 1219 620	R 1226 360
				R 1226 360	R 1233 100
				R 1233 100	R 1239 840
				R 1239 840	R 1246 580
				R 1246 580	R 1253 320
				R 1253 320	R 1260 060
				R 1260 060	R 1266 800
				R 1266 800	R 1273 540
				R 1273 540	R 1280 280
				R 1280 280	R 1287 020
				R 1287 020	R 1293 760
				R 1293 760	R 1300 500
				R 1300 500	R 1307 240
				R 1307 240	R 1313 980
				R 1313 980	R 1320 720
				R 1320 720	R 1327 460
				R 1327 460	R 1334 200
				R 1334 200	R 1340 940
				R 1340 940	R 1347 680
				R 1347 680	R 1354 420
				R 1354 420	R 1361 160
				R 1361 160	R 1367 900
				R 1367 900	R 1374 640
				R 1374 640	R 1381 380
				R 1381 380	R 1388 120
				R 1388 120	R 1394 860
				R 1394 860	R 1401 600
				R 1401 600	R 1408 340
				R 1408 340	R 1415 080
				R 1415 080	R 1421 820
				R 1421 820	R 1428 560
				R 1428 560	R 1435 300
				R 1435 300	R 1442 040
				R 1442 040	R 1448 780
				R 1448 780	R 1455 520
				R 1455 520	R 1462 260
				R 1462 260	R 1469 000
				R 1469 000	R 1475 740
				R 1475 740	R 1482 480
				R 1482 480	R 1489 220
				R 1489 220	R 1495 960
				R 1495 960	R 1502 700

Question _____		Examination Date _____	
O / O Costs for a _____		Student Name _____	
Owning Cost		Student Num. _____	
1	Working Hours		
	1.1 Per month		
	1.2 Per year		
	1.3 per week		
2	Purchase		
3	Insurance		
Total Owning cost			
Total Owning cost per hour			
Operating Cost			
4	Fuel		
5	Planned Maintenance (Preventative)		
6	Tyre Replace		
7	Undercarriage		
8	Replace item		
9	Replace item		
8	Repair Cost (Unscheduled)		
9	GET		
10	Operator		
Total Operating Cost		NT	
Total Operating Cost		OT	
Total Operating Cost per hour			
Total Cost			
Total Cost per hour			