



UNIVERSITY  
OF  
JOHANNESBURG

**FACULTY OF ENGINEERING AND BUILT ENVIRONMENT**  
**DEPARTMENT OF QUALITY OPERATIONS MANAGEMENT**

**PROGRAM** : NATIONAL DIPLOMA EXTENDED PROGRAM  
**MODULE** : OPERATIONS MANAGEMENT SECOND YEAR  
**CODE** : BPJB00  
**CAMPUS** : DOORFONTAIN CAMPUS

**MAIN EXAMINATION NOVEMBER/DECEMBER 2015**

**DATE** : SUMMER EXAMINATION 2015  
12 NOVEMBER 2015

**DURATION** : (SESSION 1) 08:30 - 11:30

**TOTAL MARKS** : 100

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**EXAMINERS** : MR. J. AGWA-EJON

**MODERATOR** : MRS. EVETH NWOBODO ANYADIEGWO

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**INSTRUCTIONS:** ANSWER **ALL THE QUESTIONS**  
IN THE PROVIDED ANSWER BOOKS AND ENSURE THAT YOUR STUDENT  
NUMBER APPEARS ON ALL THE WORK THAT YOU HAND IN. **CLOSED BOOK**

**REQUIREMENTS** : ANSWER SCRIPTS AND A CALCULATOR.

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### QUESTION 1

[20]

The Community in Dambisa has appointed you as the logistics manager to improve their transport problems. Your initial investigations reveals the following activities.

Activity	Immediate Predecessors	Duration
A	--	4
B	A	6
C	A	7
D	A	20
E	D	8
F	B	5
G	C, E	10
H	F, G	12

- 1.1 Construct a network for this project? (6)
- 1.2 Determine the critical path and the project completion time? (4)
- 1.3 Determine the ES, EF, LS, LF, for each activity in the project? (8)
- 1.4 What is the total slack value on the critical path? (2)

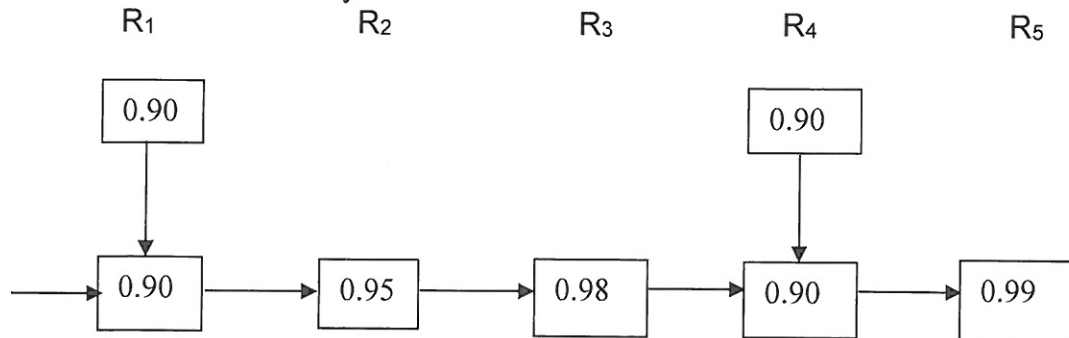
### QUESTION 2

[20]

A company that manufactures clinical thermometers subjected 100 thermometers to 5000 hours of testing. If 5 thermometers failed the test what was the failure rate in terms of the following.

- 2.1 Percentage of failures (02)
- 2.2 The number of failures per unit hour (02)
- 2.3 The Mean Time Before Failure (MTBF) (02)

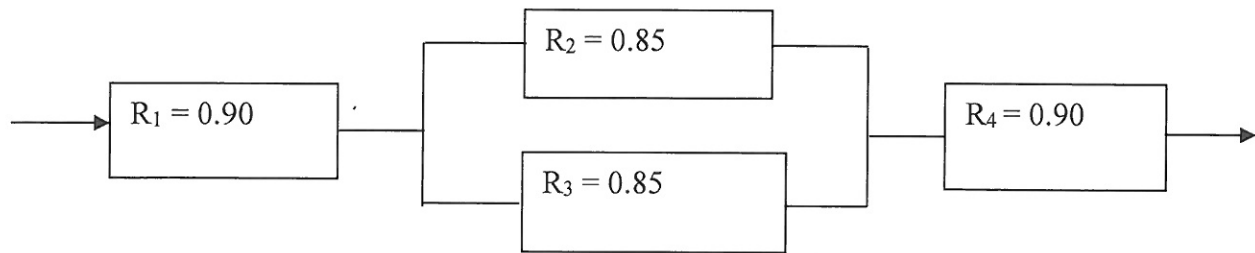
- 2.4 The recent changes in Faculty of Engineering lectures allows for backups as Illustrated in the system below.



What is the reliability of Lectures in Engineering Faculty?

(06)

- 2.5 What would be the reliability if the lecture system is represented by the parallel system below? (08)



### QUESTION 3

[20]

- 3.1 Which of the following forecasting models, uses historical data for the variable being forecast? (Time-series, Causal, Delphi and Naive). (01)
- 3.2 Which model should be selected when comparing several forecasting models to determine which one best fits a particular set of data? (01)
- 3.3 A reported income for a Grocery Store in Johannesburg for the period February – July has been as follows;

MONTH	INCOME (R1,00S)
February	70.0
March	68.5
April	64.8
May	71.7
June	71.3
July	72.8

Use exponential smoothing to forecast August's income. Assume the initial forecast for February is R65 000 and the smoothing constant given as  $\alpha = 0.1$ .

- 3.4 Using MAD, which smoothing constant provides a better forecast if the problem is resolved with an alternative of  $\alpha = 0.3$ ? (08)
- (10)

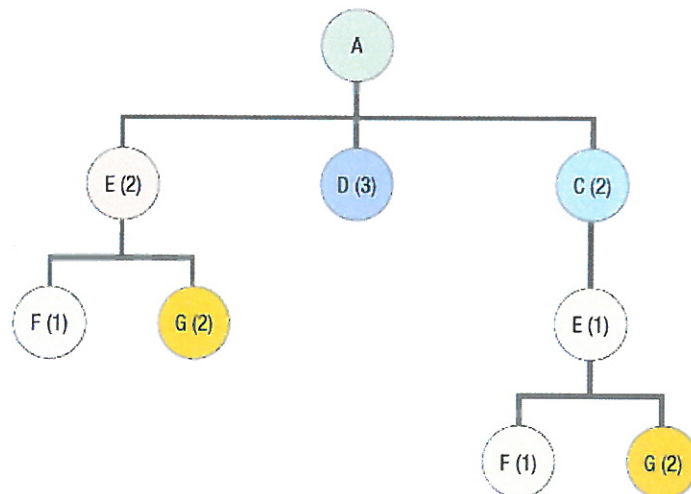
### QUESTION 4

[20]

- 4.1 Explain in your own words what you understand by the following phases:

- 4.1.1 Lot-for-Lot technique (01)
- 4.1.2 Low-level coding (01)
- 4.1.3 Modular Bill of Materials (01)
- 4.1.4 Net requirement plan (01)
- 4.1.5 Planned order release (01)

The BOM for product A is shown in Figure 4.1 below. The MPS for product A calls for 120 units to be started in weeks 2, 4, 5, and 8. Table 4.1 shows data from the inventory records.



**TABLE 4.1: INVENTORY RECORD DATA**

Data Category	ITEM				
	C	D	E	F	G
Lot-sizing rule	L4L	FOQ = 700	FOQ = 700	L4L	L4L
Lead time	3 weeks	3 weeks	4 weeks	2 weeks	1 week
Safety stock	0	0	0	50	0
Scheduled receipts	150 (week 2)	450 (week 2)	700 (week 1)	None	1 400 (week 1)
Beginning inventory	125	0	235	750	0

Please note that FOQ stands for Fixed Order Quantity (Or Multiple of 700)

- 4.2 Develop the material requirements plan for the next 8 weeks for each item (13)
- 4.3 What specific managerial actions are required in week 1?  
Make sure you address any specific difficulties you encounter in the inventory records. (02)

**QUESTION 5**

**[20]**

- 5.1 Give examples of sequencing rules that are used to prioritize work (04)
- 5.2 What are Gantt charts and why are they used so often? (04)
- 5.3 Explain the difference between infinite and finite scheduling (04)
- 5.4 What are some of typical issues involved in employee scheduling? (04)
- 5.5 Differentiate between job lateness and job tardiness. (04)

**TOTAL MARKS**

**[100]**

STUDENT NUMBER: \_\_\_\_\_ INITIAL(S) &amp; SURNAME: \_\_\_\_\_

	Weeks							
Master Schedule	1	2	3	4	5	6	7	8
Product								
Product: _____ Product Parent: _____ Level _____ Lot Size: _____ Lead Time _____ week								
Weeks	1	2	3	4	5	6	7	8
Gross Requirements								
Schedule receipts								
On hand inventory								
Net requirements								
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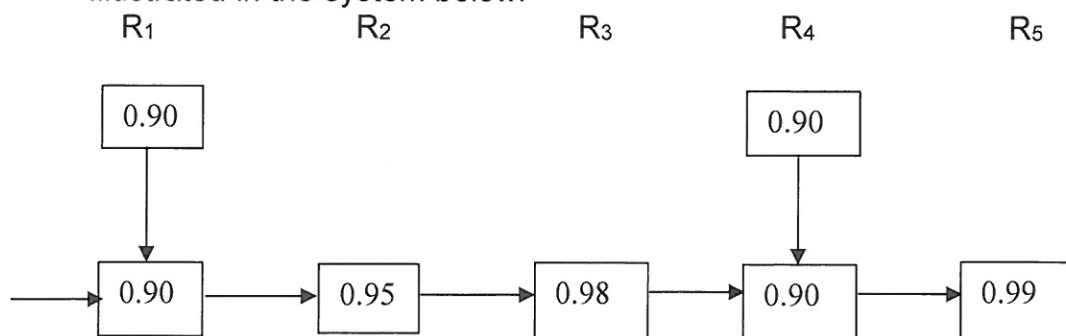
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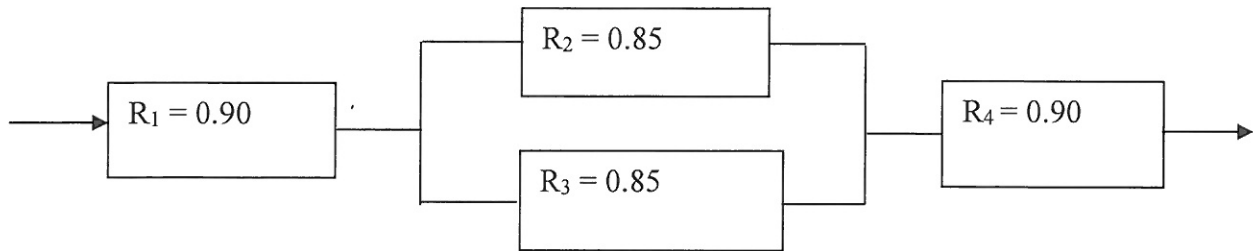


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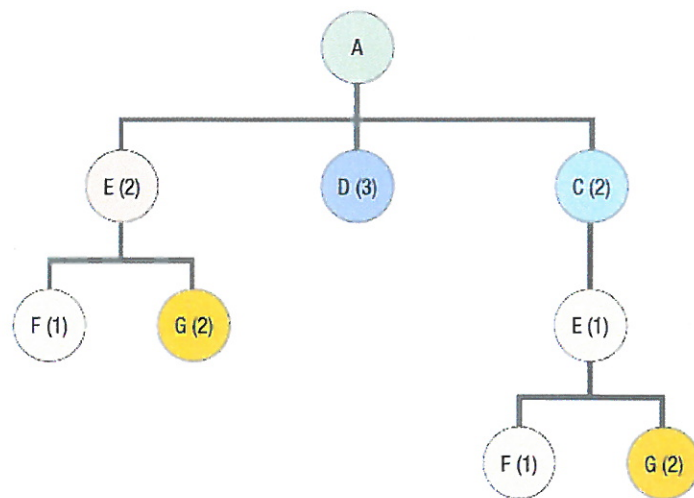
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