



**PROGRAM** : NATIONAL DIPLOMA  
*ENGINEERING : INDUSTRIAL*

**SUBJECT** : **PRODUCTION ENGINEERING II**

**CODE** : **BEP 231**

**DATE** : SUPPLEMENTARY EXAMINATION 2018  
19 JULY 2018

**DURATION** : (SESSION 2) 08:00 - 11:00

**WEIGHT** : 40 : 60

**TOTAL MARKS** : 100

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**ASSESSOR** : MR P. DUBE

**MODERATOR** : MR A. BALOYI

**NUMBER OF PAGES** : 4 PAGES

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**INSTRUCTIONS TO STUDENTS**

PLEASE ANSWER ALL QUESTIONS.

**REQUIREMENTS**

ONLY ONE POCKET CALCULATOR PER CANDIDATE MAY BE USED.  
GRAPH PAPER

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### QUESTION 1

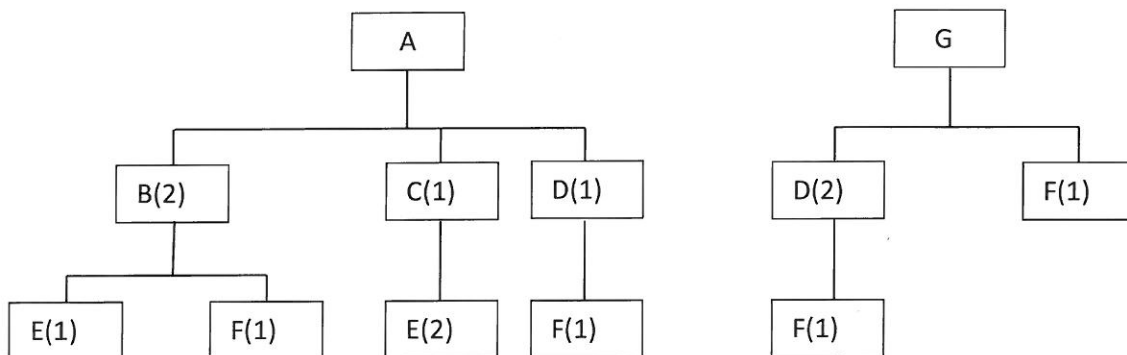
Given the product structure and gross requirements schedules for final assemblies A and G shown in Figure Q2, complete Table Q1 for item F. the lead time for F is one week. Assume that the scheduled receipts, on hand, and the lead times for A, G, B, and D are all zero.

Table: Q1

Gross requirements	Week							
	4	5	6	7	8	9	10	11
A	100	0	100	0	100	0	100	0
G	0	50	0	50	0	50	0	50

Table Q2 Data for item F

Week	4	5	6	7	8	9	10	11
Gross requirement								
Scheduled receipts	200	100	400	100	175	100	150	150
On Hand (Inventory)	100							
Planned order release								



[9]

### QUESTION 2

Assume the quantity-discount schedule in Table Q3 is appropriate.

Order Size	Discount	Unit cost
0 to 49	0%	R30
50 to 99	5%	?
100 or more	10%	?

If annual demand is 150 units, ordering cost is R20 per order, and annual inventory cost is R7.50, what order quantity would you recommend?

[12]

### QUESTION 3

In the following table, Table Q1, are precedence requirements, normal and crash activity times, and normal and crash costs for a construction project.

Table Q3

Activity	Preceding Activities	Required Time (Weeks)		Cost	
		Normal	Crash	Normal (R,000)	Crash (R,000)
A	-	4	2	10	11
B	A	3	2	6	9
C	A	2	1	4	6
D	B	5	3	14	18
E	B,C	1	1	9	9
F	C	3	2	7	8
G	E,F	4	2	13	25
H	D,E	4	1	11	18
I	H,G	6	5	20	29

3.1 What are the critical activities and the estimated completion time? (5)

3.2 To shorten the project by three weeks, which tasks would be shortened and what would the final total project cost be? (13)

[18]

### QUESTION 4

Seven jobs with different due dates arrive at a two machine flow-shop in the sequence shown in Table Q4

Job	Due Date	Processing Time	
		Machine 1	Machine 2
A	6	1	3
B	6	4	1
C	12	5	4
D	8	3	2
E	15	1	2
F	16	4	3
G	20	1	5

4.1 Apply the Shortest Processing Time (SPT) dispatching rule to schedule these jobs. (6)

4.2 Construct a Gantt chart for the schedule. How much idle time is there for each machine? What is the tardiness of all jobs? (16)

[22]

### QUESTION 5

## PRODUCTION ENGINEERING WINTER SSA EXAM 2018

A manufacturing firm produces product X in four sites –A, B, C and D. The company is able to produce the following numbers of volumes per month:

<u>PLANT</u>	<u>PRODUCTION</u>
A	40
B	20
C	30
D	25

Four warehouses purchase the following numbers of products:

<u>WAREHOUSE</u>	<u>DEMAND</u>
1.	10
2.	20
3.	10

The transportation costs are given below:

<u>FROM</u>	<u>TO</u>		
	<u>1</u>	<u>2</u>	<u>3</u>
A	R7	R8	R5
B	6	10	6
C	10	4	5
D	3	9	11

However, warehouse 2 will not accept products made in A therefore, this route is prohibited. Develop a transportation model for this problem.

[7]

### QUESTION 6

- 6.1 Explain the difference between MRPII and ERP? (4)
- 6.2 Explain the causes of bullwhip effect and how it can be prevented. (6)
- 6.3 In MRP two types of information are required, structural and tactical explain the difference in this type of information. (8)
- 6.4 Explain giving examples the difference between appraisal and prevention (8)
- 6.5 Explain the meaning of the term “autonomation” (3)
- 6.6 Give three benefits of implementing JIT system (3)

[32]