PROGRAM   : BACHELOR OF TECHNOLOGY
ENGINEERING: INDUSTRIAL

SUBJECT   : PROJECT ENGINEERING 4

CODE   : IPE 411

DATE   : WINTER EXAMINATION
4 JUNE 2015

DURATION   : (SESSION 2) 12:30 - 15:30

WEIGHT   : 50 : 50

TOTAL MARKS   : 100

ASSESSORS   : MRS C MUGOVA   MR P DUBE

MODERATOR   : MR O CHIMUSORO

NUMBER OF PAGES   : 5 PAGES INCLUDING COVER PAGE

REQUIREMENTS:

- ONLY ONE POCKET CALCULATOR PER CANDIDATE MAY BE USED.

INSTRUCTIONS TO STUDENTS:

- ANSWER ALL QUESTIONS.
- NUMBER YOUR QUESTIONS CLEARLY.

QUESTION 1

FBC Non Ferrous Inc. a metalworks foundry in Burgrusten, has long been trying to avoid the expense of installing air pollution equipment. The local environmental protection group has recently given the foundry 16 weeks to install a complex air filter system on its main smokestack. FBC Non Ferrous was warned that it will be forced to close unless the device is installed in the allotted period. The information in Table Q1 has been collected for the project.

Table Q1

Activity	Preceding activity		Optimistic a	Most probable m	Pessimistic b
				Time (weeks)	
A	-		1	2	3
B	-		2	3	4
C	A		1	2	3
D	B		2	4	6
E	C		1	4	7
F	C		1	2	9
G	D, E		3	4	11
H	F, G		1	2	3

1.1   Compute the expected time for each activity.   (7)

1.2   Compute the variance for each activity.   (6)

1.3   Determine the critical path and compute the expected project duration.   (4)

1.4   What is the probability of completing the project by week 16   (4)

1.5   What is the probability that the project will be completed between weeks 11 and 16

     (5)

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QUESTION 2

Costs have been estimated for activities of a project as shown in Table Q2 below.

Table Q2

Activity	Immediate Predecessors	Time (weeks)	Costs (R)
A	-	8	8 000
B	-	4	12 000
C	A	3	6 000
D	B	5	15 000
E	C, D	6	9 000
F	C, D	5	10 000
G	F	3	6 000

2.1   Determine the critical path.   (6)

2.2   Develop a cost schedule based on earliest start times.   (5)

2.3   Develop a cost schedule based on latest start times.   (5)

2.4   Discuss the cost schedules in 2.2 and 2.3 above in terms of the use of financial resources and cash flow for the project.   (4)

2.5   What is the main disadvantage of using the latest time cost schedule? What would be the ideal cost schedule?   (4)

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QUESTION 3

Scot Builders manufactures wooden storage sheds for commercial use. Tom Scot, president of Scot builders, is contemplating producing sheds for home use. The activities necessary to build an experimental model and related data are given in Table Q3 below.

Table Q3

Activity	Immediate Predecessor	Time (weeks) Normal	Crash	Cost (R) Normal	Crash
A	-	3	2	1 000	1 600
B	-	2	1	2 000	2 700
C	-	1	1	300	300
D	A	7	3	1 300	1 600
E	B	6	3	850	1 000
F	C	2	1	4 000	5 000
G	D, E	4	2	1 500	2 000

3.1   What are the critical activities and the estimated project completion time?   (7)

3.2   To reduce the project completion time to 10 weeks, which tasks should be shortened and what would be the final total project cost?   (13)

[20]

QUESTION 4

4.1   Discuss the importance of project management in contributing to the strategic direction of an organization.   (5)

4.2   Identify and briefly describe with practical examples, any five (5) risk response strategies that can be used by organizations in project environments.   (10)

4.3   What are the weaknesses of using dedicated project teams in administering and completing projects?   (4)

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QUESTION 5

5.1   Due to increased demand, the management of a Beverage Company is considering to purchase new equipment to increase production and revenues. The useful life of the equipment is 10 years and the company's maximum desired payback period is 4 years. The initial cost of the equipment is R37 000. The inflow and outflow of cash associated with the new equipment is given in Table Q5 below. Should the Beverage Company purchase the new equipment? Use the payback method to make your decision.

(7)

Table Q5

Annual cash inflow/outflow (R)	
Sales	75 000
Cost of ingredients	45 000
Salaries	13 500
Maintenance	1 500

5.2   The management of Healthy Eating Inc. wants to reduce its labour cost by installing a new machine. Two types of machines are available on the market – Machine X, and

Machine Y. Machine X costs R18 000 whereas Machine Y costs R15 000. Both machines can reduce annual labour cost by R3 000.

Use the payback method to determine the machine that would be more desirable. (4)

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[TOTAL: 100 MARKS]