UNIVERSITY OF JOHANNESBURG

PROGRAM	:	BACHELOR ENGINEERING TECHNOLOGY INDUSTRIAL
SUBJECT	:	**PROJECT ENGINEERING 3A**
CODE	:	**PENMIA3**
DATE	:	SUPPLIMENTARY EXAMINATION 19 JULY 2019
DURATION	:	(SESSION 1) 08:00-11:00 am
WEIGHT	:	40 : 60
TOTAL MARKS	:	100

ASSESSOR	:	MR T.A BALOYI
MODERATOR	:	MR O. SEPHOTI
NUMBER OF PAGES	:	6 PAGES

INSTRUCTIONS :

- ANSWER ALL QUESTIONS

REQUIREMENTS:

- 2 SHEETS GRAPH PAPER.
- A NONPROGRAMABLE CALCULATOR IS ALOWED
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QUESTION 1

South American Adventures Unlimited

This case was included in the first two editions of the book and is included here so that teachers can hand it out or post it on the web for class discussion.

SA Adventures Unlimited was formed four years ago by Michael and Jill Rodriguez. Michael was a trained geologist, while Jill had a master's degree in Spanish. They were both avid outdoor enthusiasts and fell in love while trekking across the Andes in Chile. Upon graduation they seized upon the idea of starting their own specialized tour business that would focus on organizing and leading "high-end" adventure trips in South America. Their first trip was a three-week excursion across Ecuador and Peru. The trip was a resounding success, and they became convinced that they could make a livelihood doing something they both enjoyed.

After the first year, Adventures Unlimited began to slowly expand the size and scope of the business. The Rodriguezes' strategy was a simple one. They recruited experienced, reliable people who shared their passion for South America and the outdoors. They helped these people organize specific trips and advertised the excursion over the Internet and in travel magazines.

Adventures Unlimited has grown from offering 4 trips a year to having 16 different excursions scheduled, including trips to Central America. They now had an administrative support staff of three people and a relatively stable group of five trip planners/guides whom they hired on a trip-by-trip contract basis. The company enjoyed a high level of repeat business and often used their customers' suggestions to organize future trips.

Although the Rodriguezes were pleased with the success of their venture, they were beginning to encounter problems that worried them about the future. A couple of the tours went over budget because of unanticipated costs, which eroded that year's profit. In one case, they had to refund 30 percent of the tour fee because a group was stranded five days in Blanco Puente after missing a train connection. They were also having a hard time maintaining the high level of customer satisfaction to which they were accustomed. Customers were beginning to complain about the quality of the accommodations and the price of the tours. One group, unfortunately, was struck by a bad case of food poisoning. Finally, the Rodriguezes were having a hard time tracking costs across projects and typically did not know how well they did until after their taxes were prepared. This made it difficult to plan future excursions.

The Rodriguezes shared these concerns around the family dinner table. Among the members in attendance was Michael's younger brother, Mario, a student at a nearby university. After dinner, Mario approached Michael and Jill and suggested that they look into what business people called "project management." He had been briefly exposed to project management in his Business Operations class and felt that it might apply to their tour business.

1.1 To what extent does project management apply to Adventures Unlimited? (5)

1.2 What kind of training in project management should the Rodriguezes, the administrative staff, and tour guides receive to improve the operation of Adventures Unlimited? Try to identify major topics or skill sets that should be addressed. (10)

QUESTION 2

You are the head of the project selection team at Broken Arrow records. Your team is considering three different recording projects. Based on past history, Broken Arrow expects at least a rate of return of 20 percent. Your financial advisors predict inflation to remain at 2 percent into the foreseeable future.
Given the following information for each project, which one should be Broken Arrow's first priority? Should Broken Arrow fund any of the other projects? If so, what should be the order of priority based on return on investment? (10)

Recording Project: **Time Fades Away**

Year	Inflows	Outflows
0		600,000
1	600,000	
2	75,000	
3	20,000	
4	15,000	
5	10,000	

Recording Project: **On the Beach**

Year	Inflows	Outflows
0		400,000
1	400,000	
2	100,000	
3	25,000	
4	20,000	
5	10,000	

Recording Project: **Tonight's the Night**

Year	Inflows	Outflows
0		200,000
1	200,000	
2	125,000	
3	75,000	
4	25,000	
5	10,000	

QUESTION 3

3.1 Discuss why is it important to assess the culture of an organization before deciding what project management structure should be used to complete a project? (6)

3.2 Discuss under what conditions would it be advisable to use a strong matrix instead of a dedicated project team. (6)

QUESTION 4

You are in charge of organizing a dinner-dance concert for a local charity. You have reserved a hall that will seat 30 couples and have hired a jazz combo.
Develop a scope statement for this project that contains examples of all the elements. Assume that the event will occur in 4 weeks and provide your best guess estimate of the dates for milestones. (12)

QUESTION 5

Discuss why accurate estimates are critical to effective project management. (8)

QUESTION 6

The project information for the custom order project of the Air Control Company is presented here. Draw a project network for this project. Compute the early and late activity times and slack times. Identify the critical path (13)

ID	Description	Predecessor	Time
A	Order Review	None	2
B	Order standard parts	A	15
C	Produce standard parts	A	10
D	Design Custom parts	A	13
E	Software development	A	18
F	Manufacture custom hardware	C,D	15
G	Assemble	B,F	10
H	Test	E,G	5

QUESTION 7

The expected times and variances for the project activities are given below. What is the probability of completing the project in 25 periods? (6)

ID	Description	Predecessor	t_e	Variance $[(b-a)/6]^2$	Critical
1	Pilot production	None	6	3	
2	Select channels of distrib.	None	7	4	
3	Develop mktg. program	None	4	2	
4	Test market	1	4	2	
5	Patent	1	10	5	
6	Full production	4	16	10	
7	Ad promotion	3	3	2	
8	Release	2,5,6,7	2	1	

QUESTION 8

8.1 Discuss the major differences between managing negative risks versus positive risks (opportunities)? (6)

8.2 Explain the risks associated with leveling resources, compressing or crashing projects, and imposed durations or "catch-up" as the project is being implemented. (6)

8.3 How can a cost-duration graph be used by the project manager? Explain. (4)

QUESTION 9

What differences would you expect to see between the kinds of influence currencies that a project manager in a functional matrix would use and the influence a project manager of a dedicated project team would use? (8)

TABLES AND FORMULAS

TABLE 5.2
Simplified Basic Function Point Count Process for a Prospective Project or Deliverable

	Complexity Weighting			
Element	**Low**	**Average**	**High**	**Total**
Number of *inputs*	_____ × 2 +	_____ × 3 +	_____ × 4	= _____
Number of *outputs*	_____ × 3 +	_____ × 6 +	_____ × 9	= _____
Number of *inquiries*	_____ × 2 +	_____ × 4 +	_____ × 6	= _____
Number of *files*	_____ × 5 +	_____ × 8 +	_____ × 12	= _____
Number of *interfaces*	_____ × 5 +	_____ × 10 +	_____ × 15	= _____

TABLE A7.2
***Z* Values and Probabilities**

Z Value	Probability	*Z* Value	Probability
−3.0	.001	+0.0	.500
−2.8	.003	+0.2	.579
−2.6	.005	+0.4	.655
−2.4	.008	+0.6	.726
−2.2	.014	+0.8	.788
−2.0	.023	+1.0	.841
−1.8	.036	+1.2	.885
−1.6	.055	+1.4	.919
−1.4	.081	+1.6	.945
−1.2	.115	+1.8	.964
−1.0	.159	+2.0	.977
−0.8	.212	+2.2	.986
−0.6	.274	+2.4	.992
−0.4	.345	+2.6	.995
−0.2	.421	+2.8	.997

$$t_e = \frac{a + 4m + b}{6}$$

$$\sigma_{t_e} = \left(\frac{b - a}{6}\right)$$

$$\sigma_{T_E} = \sqrt{\Sigma\sigma_{t_e}^2}$$

$$Z = \frac{T_S - T_E}{\sqrt{\Sigma\sigma_{t_e}^2}}$$

where T_E = critical path duration
T_S = scheduled project duration
Z = probability (of meeting scheduled duration) found in statistical Table A7.2