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L-4/T-1/IPE

Date: 11/09/2025

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 B. Sc. Engineering Examinations 2023-2024

Sub: **IPE 403** (Project and Environmental Management)

Full Marks: 210

Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION - A

There are **FOUR** questions in this section. **Answer to Question No. 1 is compulsory.**

Answer any **TWO** from the remaining questions 2-4.

1. (a) Elaborate five crucial elements of project plan need to be involved for a construction project. (9)
(CO1)
- (b) Chartering is a written agreement within a company. With how many different entities PM need to do this agreement? What are the areas/items to be covered for each entity? (6)
(CO4)
- (c) For the following task table, draw the network diagram, calculate project duration, find the critical path, and calculate slack time for each task. Draw the GANTT Chart. (20)
(CO3)

Task	Successor	Duration (days)
I	C, H	4
B	H, F	3
C	A	5
H	A, D	5
F	D	4
A	J, E	6
D	E, G	6
J	-	7
E	-	7
G	-	5

2. (a) How can you distinguish Team from Group in a project environment? (5)
- (b) Briefly explain the three basic techniques of cybernetic control. (10)
- (c) For the following activity table, find different possible crash times and corresponding costs for the project. (20)

Contd P/2

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Contd.... for Q. No. 2(c)

Activity	Predecessor	Duration (day)		Cost (USD)	
		Normal	Crash	Normal	Crash
a	----	3	3	40	40
b	a	5	3	40	80
c	a	4	3	40	70
d	b	6	4	60	110
e	c	4	4	50	50
f	d, e	3	1	40	100

3. (a) With real life examples, discuss Functional, Matrix and Dedicated project structures. (10)
- (b) How is negotiation related to Breadth of communication? (8)
- (c) For the following activity table, obtain a schedule to keep the manpower requirement with 20: (17)

Activity	Duration (month)	Manpower Requirement
1-2	4	20
1-3	5	8
2-3	8	10
2-4	8	4
3-4	4	14

4. (a) Why is economic feasibility important for a project? How can you distinguish it from financial feasibility? Discuss with a real life project. (10)
- (b) Briefly explain different types of change that can affect project negotiation. (9)
- (c) Mention four requirements for WBS. Out of these four, which one is the most important and why? Discuss with example. (11)
- (d) Network and GANTT chart both techniques can represent the inter-relationship among different activities of a Project. Mention their differences based on user with logic. (5)

Contd P/3

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SECTION – B

There are **FOUR** questions in this section. **Answer to Question No. 5 is compulsory.**
Answer any **TWO** from the remaining questions 6-8.

5. (a) Briefly describe the sources of air pollution. (10)
(CO2)
(b) Write short notes on the following greenhouse gases: (12)
(CO2)
(i) Water Vapor; (ii) Carbon Dioxide; (iii) Ozone
(c) Explain some of the most significant features of Montreal protocol. (13)
(CO2)
6. (a) Draw the flow diagram of the certification process for Red category industry. (10)
(b) Explain technical and planning alternatives for pollution prevention. (10)
(c) Explain the six clauses of ISO 14000. (15)
7. (a) Post control activities are performed after completion of the project. What is the benefit to evaluate a project after completion? Briefly discuss the key elements of Post control. (8)
(b) Briefly discuss the four phases of project life cycle. (8)
(c) Compare the responsibilities of a project manager and a functional manager between heavy matrix structure and dedicated structure. (7)
(d) Consider a project requiring 65 units of products to be produced. An expert worker takes 10 hrs to complete a single part. However, 25 parts need to be produced to be an expert at 80% learning rate. If the wage rate is Tk. 250/hr, by how much amount will be the budget underestimated without considering the learning effect? (12)
8. (a) Why do you need to submit three different budgets based on time phase to top management? (8)
(b) Elaborate the principles for data collection in monitoring a project? Which one is more appropriate for a bridge construction? Justify. (9)
(c) For the following activity table, obtain a schedule to keep the manpower requirement balanced: (18)

Activity	Duration (month)	Manpower Requirement
1-2	3	12
1-3	5	6
1-4	3	13
2-3	5	11
2-4	2	9
3-5	3	25
4-5	3	9

4

Learning Rate Coefficients

Unit Number	70%		75%		80%		85%		90%	
	Unit Time	Total Time	Unit Time	Total Time	Unit Time	Total Time	Unit Time	Total Time	Unit Time	Total Time
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	0.700	1.700	0.750	1.750	0.800	1.800	0.850	1.850	0.900	1.900
3	0.568	2.268	0.634	2.384	0.702	2.502	0.773	2.623	0.846	2.746
4	0.490	2.758	0.563	2.946	0.640	3.142	0.723	3.345	0.810	3.556
5	0.437	3.195	0.513	3.459	0.596	3.738	0.686	4.031	0.783	4.339
6	0.398	3.593	0.475	3.934	0.562	4.299	0.657	4.688	0.762	5.101
7	0.367	3.960	0.446	4.380	0.534	4.834	0.634	5.322	0.744	5.845
8	0.343	4.303	0.422	4.802	0.512	5.346	0.614	5.936	0.729	6.574
9	0.323	4.626	0.402	5.204	0.493	5.839	0.597	6.533	0.716	7.290
10	0.306	4.932	0.385	5.589	0.477	6.315	0.583	7.116	0.705	7.994
11	0.291	5.223	0.370	5.958	0.462	6.777	0.570	7.686	0.695	8.689
12	0.278	5.501	0.357	6.315	0.449	7.227	0.558	8.244	0.685	9.374
13	0.267	5.769	0.345	6.660	0.438	7.665	0.548	8.792	0.677	10.052
14	0.257	6.026	0.334	6.994	0.428	8.092	0.539	9.331	0.670	10.721
15	0.248	6.274	0.325	7.319	0.418	8.511	0.530	9.861	0.663	11.384
16	0.240	6.514	0.316	7.635	0.410	8.920	0.522	10.383	0.656	12.040
17	0.233	6.747	0.309	7.944	0.402	9.322	0.515	10.898	0.650	12.690
18	0.226	6.973	0.301	8.245	0.394	9.716	0.508	11.405	0.644	13.334
19	0.220	7.192	0.295	8.540	0.388	10.104	0.501	11.907	0.639	13.974
20	0.214	7.407	0.288	8.828	0.381	10.485	0.495	12.402	0.634	14.608
21	0.209	7.615	0.283	9.111	0.375	10.860	0.490	12.892	0.630	15.237
22	0.204	7.819	0.277	9.388	0.370	11.230	0.484	13.376	0.625	15.862
23	0.199	8.018	0.272	9.660	0.364	11.594	0.479	13.856	0.621	16.483
24	0.195	8.213	0.267	9.928	0.359	11.954	0.475	14.331	0.617	17.100
25	0.191	8.404	0.263	10.191	0.355	12.309	0.470	14.801	0.613	17.713
26	0.187	8.591	0.259	10.449	0.350	12.659	0.466	15.267	0.609	18.323
27	0.183	8.774	0.255	10.704	0.346	13.005	0.462	15.728	0.606	18.929
28	0.180	8.954	0.251	10.955	0.342	13.347	0.458	16.186	0.603	19.531
29	0.177	9.131	0.247	11.202	0.338	13.685	0.454	16.640	0.599	20.131
30	0.174	9.305	0.244	11.446	0.335	14.020	0.450	17.091	0.596	20.727
31	0.171	9.476	0.240	11.686	0.331	14.351	0.447	17.538	0.593	21.320
32	0.168	9.644	0.237	11.924	0.328	14.679	0.444	17.981	0.590	21.911
33	0.165	9.809	0.234	12.158	0.324	15.003	0.441	18.422	0.588	22.498
34	0.163	9.972	0.231	12.389	0.321	15.324	0.437	18.859	0.585	23.084
35	0.160	10.133	0.229	12.618	0.318	15.643	0.434	19.294	0.583	23.666
36	0.158	10.291	0.226	12.844	0.315	15.958	0.432	19.725	0.580	24.246
37	0.156	10.447	0.223	13.067	0.313	16.271	0.429	20.154	0.578	24.824
38	0.154	10.601	0.221	13.288	0.310	16.581	0.426	20.580	0.575	25.399
39	0.152	10.753	0.219	13.507	0.307	16.888	0.424	21.004	0.573	25.972
40	0.150	10.902	0.216	13.723	0.305	17.193	0.421	21.425	0.571	26.543
41	0.148	11.050	0.214	13.937	0.303	17.496	0.419	21.844	0.569	27.111
42	0.146	11.196	0.212	14.149	0.300	17.796	0.416	22.260	0.567	27.678
43	0.144	11.341	0.210	14.359	0.298	18.094	0.414	22.674	0.565	28.243
44	0.143	11.484	0.208	14.567	0.296	18.390	0.412	23.086	0.563	28.805
45	0.141	11.625	0.206	14.773	0.294	18.684	0.410	23.496	0.561	29.366
46	0.139	11.764	0.204	14.977	0.292	18.975	0.408	23.903	0.559	29.925
47	0.138	11.902	0.202	15.180	0.290	19.265	0.405	24.309	0.557	30.482
48	0.136	12.038	0.201	15.380	0.288	19.552	0.403	24.712	0.555	31.037
49	0.135	12.173	0.199	15.579	0.286	19.838	0.402	25.113	0.553	31.590
50	0.134	12.307	0.197	15.776	0.284	20.122	0.400	25.513	0.552	32.142
51	0.132	12.439	0.196	15.972	0.282	20.404	0.398	25.911	0.550	32.692
52	0.131	12.570	0.194	16.166	0.280	20.684	0.396	26.307	0.548	33.241
53	0.130	12.700	0.192	16.358	0.279	20.963	0.394	26.701	0.547	33.787
54	0.128	12.828	0.191	16.549	0.277	21.239	0.392	27.094	0.545	34.333
55	0.127	12.955	0.190	16.739	0.275	21.515	0.391	27.484	0.544	34.877
56	0.126	13.081	0.188	16.927	0.274	21.788	0.389	27.873	0.542	35.419
57	0.125	13.206	0.187	17.114	0.272	22.060	0.388	28.261	0.541	35.960
58	0.124	13.330	0.185	17.299	0.271	22.331	0.386	28.647	0.539	36.499
59	0.123	13.453	0.184	17.483	0.269	22.600	0.384	29.031	0.538	37.037
60	0.122	13.574	0.183	17.666	0.268	22.868	0.383	29.414	0.537	37.574