L-4/T-1/CE **Date : 13/12/2014**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 B. Sc. Engineering Examinations 2012-2013

Sub : **CE 401** (Project Planning and Construction Management)

Full Marks: 280 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

There are **EIGHT** questions in this section. Answer Q. No. 1 and any **FIVE** from the rest.

1. Answer any five of the following: **(5×8=40)**

   (a) Differentiate between "Forward Planning", "Backward Planning" and "Combined Planning".

   (b) Define "Optimistic time estimate", "Pessimistic time estimate" and "Most likely time estimate".

   (c) Explain "Expression of Interest (EOI)". What are the advantages and limitations of EOI?

   (d) "Equipment make it possible" — Explain the statement and state the importance of equipment in construction.

   (e) Explain "project management cycle".

   (f) List the Functions of the following equipment:

   (i) Excavator (ii) Asphalt pavers (iii) Road Roller.

   (g) What do you understand by "Cost-Slope"? How do you determine it?

2. Figure-1 shows the [illegible] for a construction project, with the three time estimates of each activity marked. Determine **(20)**

   (i) Critical path and its standard deviation.

   (ii) Probability of completion of project in 38 days.

   (iii) Time duration that will provide 95% probability of its completion time.

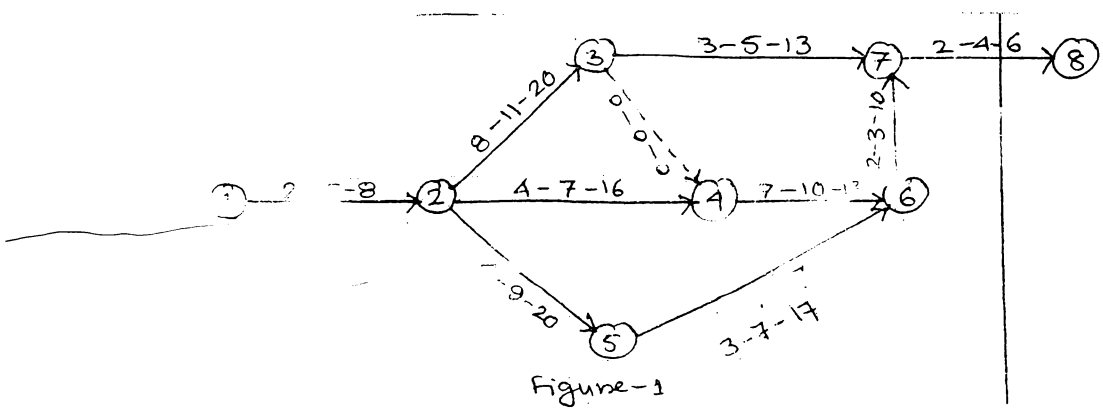


Figure-1

3. (a) Explain the tendering process with a flow diagram. Differentiate between "single" and "two stage" tendering. **(10)**

(b) What are the steps to follow to make a construction site safe? Give some examples of personal protective equipments in construction site. **(10)**

4. The network of a construction project is shown in Figure-2, along with the duration of each activity. Compute activity time and total Float of each activity. Locate the critical path on the network. **(20)**

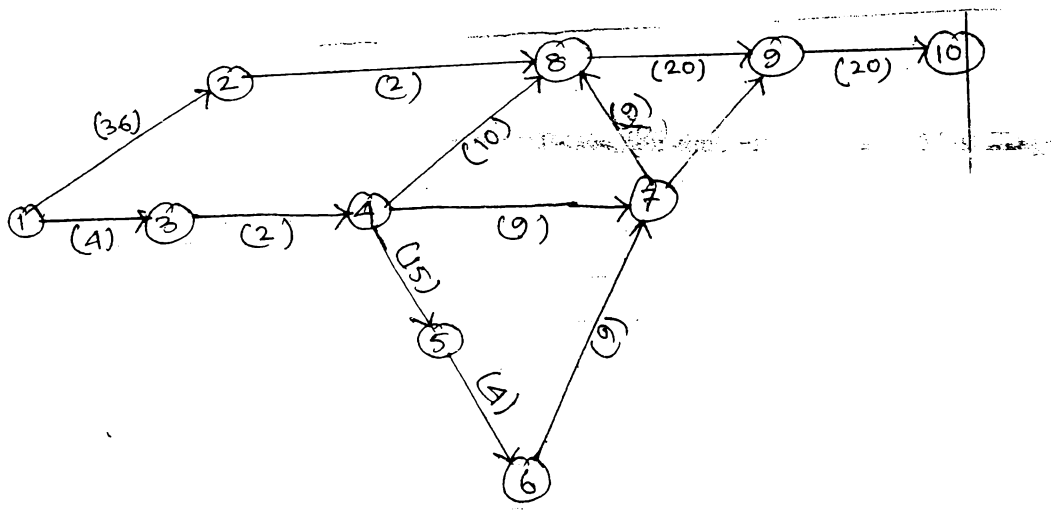


Figure-2

5. (a) A construction project consists of 12 activities. The predecessor relationships are identified by their node numbers as indicated below: **(10)**

Activity	Identification	Activity	Identification
A	(1, 2)	G	(4, 6)
B	(2, 4)	H	(5, 6)
C	(2, 3)	I	(5, 7)
D	(2, 7)	J	(7, 8)
E	(3, 4)	K	(6, 8)
F	(3, 5)	L	(8, 9)

Draw the network diagram.

(b) Explain needs for Inspection and Quality Control in construction project. Show the application of Quality Control Cycle to public works projects. **(10)**

Contd P/3

6. Table-1 gives the information about various activities of network shown in Figure-3. **(20)**

Table-1

Activity	Normal duration (days)	Normal cost (Tk.)	Crash duration (days)	Crash cost (Tk.)
1–2	9	80,000	6	95,000
2–3	5	50,000	3	55,000

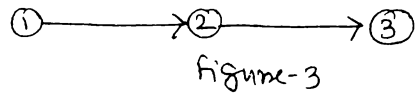


Figure-3

The project overhead costs are @ 3,000 Tk./day. Determine (i) direct cost - duration relationship (ii) total cost - duration relationship and optimum duration and minimum cost.

7. (a) A manufacturer produces two products, X and Y with two machines, A and B. The cost of producing each unit of X is for machine A : 50 minutes and for machine B : 30 minutes. The cost of producing each unit of Y is for machine A : 24 minutes and for machine B : 33 minutes. Working plan for a particular week are: 40 hrs of work on machine A and 35 hours of work on machine B. The week starts with a stock of 30 units of X and 90 units of Y, and a demand of 75 units of X and 95 units of Y. How do you plan the production in order to end the week with the maximum stock? Use linear programming (LP). **(10)**

(b) What are the assumptions made to formulate and solve linear programming model? Differentiate between PERT network and CPM network with diagram **(10)**

8. (a) The network for a certain project is shown in Figure-4. Determine the expected time for each path. Which path is critical. **(10)**

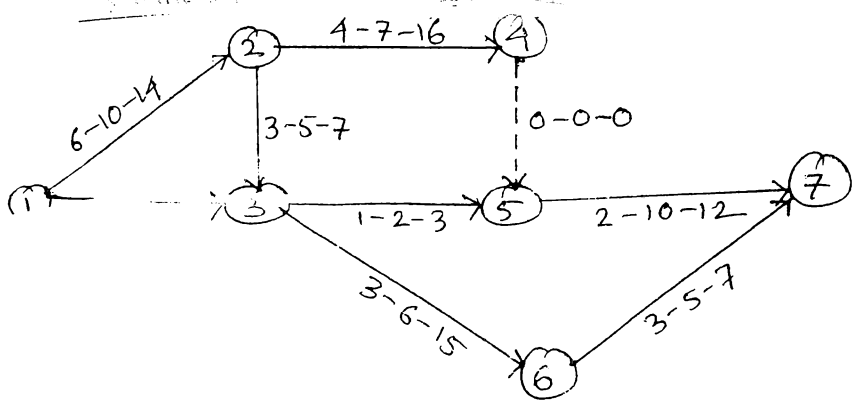


Figure-4

(b) What is a milestone chart? How does it differ from a bar chart? Why safety in construction site is utmost important? **(10)**

Contd P/4

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.
Assume reasonable values for missing data.

9. (a) Define comprehensively the terms "management", "delegation" and "power" and briefly explain the different schools of thought in management. List the factors in (i) departmentation and (ii) decentralization. **(24)**

(b) Briefly explain the philosophy underlying the selection of appropriate discount rate and the length of project period of economic analysis. **(22⅔)**

What is the yield for a project where $200,000 is invested to produce cash flows of $50,000; $50,000; $60,000; $60,000; and $44,000 during year 1, 2, 3, 4 and 5 respectively? The project has a salvage value of $10,000.

10. State you understanding and classifications of human needs in the context of motivation. Discuss the factors in influencing and the guides and methods of disciplining. State the conditions that foster voluntary co-operation in the organisation and some desirable important personality characteristics of a manager. **(24)**

(b) Briefly explain the principal differences between the Capital Recovery Factor and the Annuity Factor. Explain clearly the meaning and implications of Internal Rate of Return (IRR) of the projects. A piece of new construction equipment will cost $60,000 and will have an expected life of 6 years, with no salvage value at the end of its life. The annual disbursements for operation, maintenance, fuel etc are estimated to be $12,000. What is the equivalent uniform annual cost of this piece of equipment if the rate of interest is 12%? What is the present worth of the disbursements at 12%? **(22⅔)**

11. (a) (i) Define clearly the term "motivation" and explain the importance of the role of Civil Engineering Leadership in the government sector. **(11)**

(i) Explain clearly why do we need a Feasibility Report of a project. Also explain "Project Life Cycle" and the chief distinctions between Economic analysis and Financial analysis of a project. **(12)**

(b) (i) What are the conflict response alternatives? Narrate advantages and disadvantages of each conflict resoiving styles. **(11)**

(ii) What is the definition of Economic Order Quantity and Inventory Turnover Ratio? Define safety stock and lead time. **(12⅔)**

12. (a) What do you mean by "Golden Hour"? What are the benefits of it and how can you apply it in "HRM"? Explain "clean break" and "clean focus" with examples in your life. **(21⅔)**

(b) Explain the work types ABCDE with examples in practical life. What are the HRM functional components and which one is more important? What are the techniques of conducting effective meeting? **(25)**

CE-401

Table 2 Standard Normal Distribution Function Q.2

Z (+)	Probability (P_r)(%)	Z (−)	Probability (P_r)(%)
0	50·0	0	50·0
+0·1	53·98	−0·1	46·02
+0·2	57·93	−0·2	42·07
+0·3	61·79	−0·3	38·21
+0·4	65·54	−0·4	34·46
+0·5	69·15	−0·5	30·85
+0·6	72·57	−0·6	27·43
+0·7	75·80	−0·7	24·20
+0·8	78·81	−0·8	21·19
+0·9	81·59	−0·9	18·41
+1·0	84·13	−1·0	15·87
+1·1	86·43	−1·1	13·57
+1·2	88·49	−1·2	11·51
+1·3	90·32	−1·3	9·68
+1·4	91·92	−1·4	8·08
+1·5	93·32	−1·5	6·68
+1·6	94·52	−1·6	5·48
+1·7	95·54	−1·7	4·46
+1·8	96·41	−1·8	3·59
+1·9	97·13	−1·9	2·87
+2·0	97·72	−2·0	2·28
+2·1	98·21	−2·1	1·79
+2·2	98·61	−2·2	1·39
+2·3	98·93	−2·3	1·07
+2·4	99·18	−2·4	0·82
+2·5	99·38	−2·5	0·62
+2·6	99·53	−2·6	0·47
+2·7	99·65	−2·7	0·35
+2·8	99·74	−2·8	0·26
+2·9	99·81	−2·9	0·19
+3·0	99·87	−3·0	0·13

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 B. Sc. Engineering Examinations 2011-2012

Sub : **CE 401** (Project Planning and 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 any **THREE**.

1. (a) Define 'normal project time' 'normal cost', 'crash time', and 'crash cost'. What do you understand by 'cost slope'? **(8)**

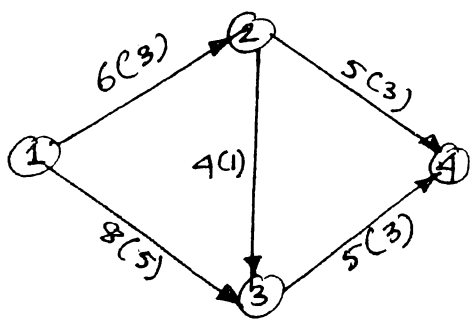
(b) Figure-1 shows the network for a project, the data for the duration and costs of each activity are given in following Table. **(15)**

Activity	Normal duration (Weeks)	Normal Cost (Tk.)	Crash duration (weeks)	Crash Cost (Tk.)
1-2	6	7000	3	14500
1-3	8	4000	5	8500
2-3	4	6000	1	9000
2-4	5	8000	3	15000
3-4	5	5000	3	11000

The direct cost of the project is Tk. 3000/week. Determine the optimum duration of the project and the corresponding minimum cost.

(c) List the steps of process of time-cost optimization. **(6)**

(d) What is a milestone chart? How does it differ from a bar chart? How can mile-stone chart be developed into a network? **(6)**



Figure–1 for question 1(d)

2. (a) Explain in brief the difference between PERT and CPM networks. Explain the circumstances under which one is preferred over the other. **(7)**

(b) Briefly discuss the standard form of Linear program (L.P) model. What are the assumptions that we made while using LP model. **(6)**

(c) A school is preparing a trip for 400 students. The company who is providing the transportation has 10 buses of 50 seats each and 8 buses of 40 seats each, but only has 9

Contd P/2

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

drivers available. The rental cost for a large bus is USD 800 and USD 600 for a small bus. Calculate how many buses of each type should be used for the trip for the least possible cost using LP model. **(14)**

(d) Explain the importance of Equipment in construction Industry. State the uses of following construction equipment: **(8)**

Excavator, Cranes, Asphalt paver, Cold milling machine.

3. (a) For the network shown in Figure-2 determine the probability of completing the project in 31 days. Also calculate time duration that will provide 96% probability of its completion in time . Standard duration along the critical path 4.47. **(15)**

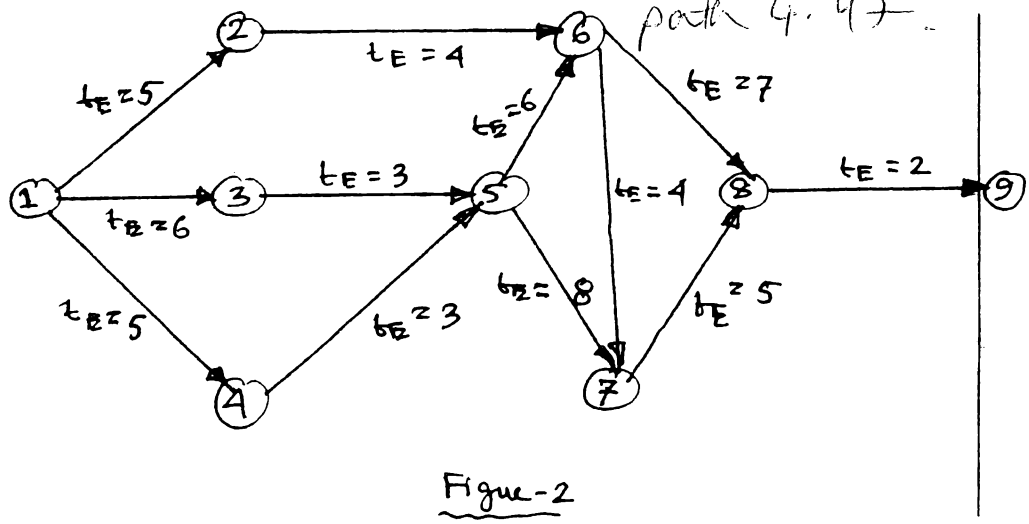


Figure-2

(b) The network of a certain project is shown in Figure-3 with estimated durations of various activities. Determine following: **(20)**

(i) event time of each event.

(ii) Earliest and latest start and finish times of each activity.

(iii) Total and free floats for each activity.

(iv) Critical paths for the network.

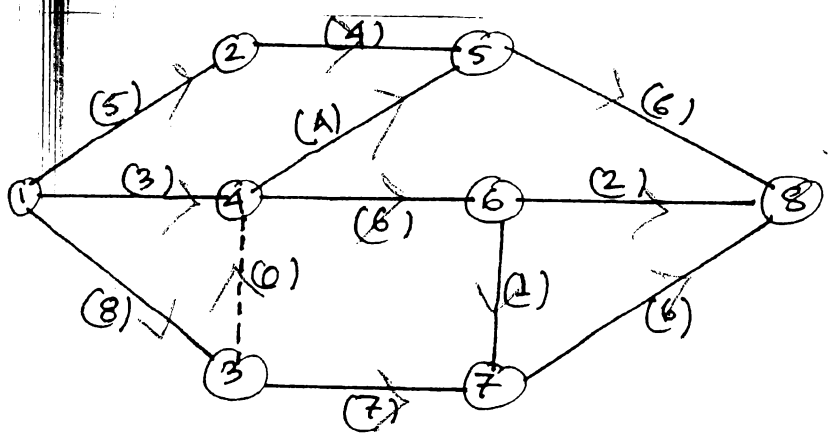


Figure-3

Contd P/3

CE 401

4. (a) What steps should be taken to make a construction site safe? List some personal protective equipment used in construction site. **(11)**

(b) Explain "Tenders Inviting" phase and "Tenders Evaluation" Phase of a tendering process. **(9)**

(c) Explain application of Quality Control cycle to public works projects. Why are accidents increasing in construction industries in recent time? **(7)**

(d) The maintenance project of a building consists ten jobs. The predecessor relationships are identified by their node numbers, as indicated below: **(8)**

Job	Identifications	Job	Identifications
A	(1, 2)	F	(4, 5)
B	(2, 3)	G	(4, 7)
C	(2, 4)	H	(5, 8)
D	(3, 6)	I	(6, 8)
E	(3, 5)	J	(7, 8)

Draw the network diagram for the project.

SECTION – B

There are **FOUR** questions in this Section. Answer any **THREE**.

Necessary assumptions could be made for any missing information and data.

5. (a) How do you define management and in which way management is different from administration. State the main essential task of management and typical management questions that underlie decisions in each organisation. Briefly outline the elements of the process of management. **(17)**

(b) Discuss the concepts of delegation and authority relationships. List the factors in delegation and several problems of using a "Staff" man in an organization. Explain influencing and disciplining and state some leadership functions and guides for leaders' behaviour. **(18)**

6. (a) State some positive and negative outcomes of conflicts in management and the objectives of wage incentives. Discuss the following: **(15)**

(i) issuing orders and

(ii) collective bargaining

(b) State the importance, dimensions and limitations of planning. Write shorts notes on: **(18)**

(i) Creation of jobs and departmentation.

(ii) Stores and materials management and

(iii) Organizing Construction Supervision and the Staff requirements.

Contd P/4

CE 401

7. (a) Explain Maslow-McGregor models of human motivation. Discuss the fundamental principles of meeting human needs through organization. **(12)**

(b) Define and differentiate between internal rate of return and crossover discount rate. Alternative designs for a building are prepared:- one in structural steel work and other with reinforced concrete frame. Details are given below: **(23)**

	R.C Building	Steel Building
Initial Cost	$ 600,000	$ 220,000
Life	60 years	20 years
Maintenance/year	$ 5,000	$ 2,000
Salvage Value	$ 150,000	$ 25,000

Which building offers the better economic proposition, if the building owner has cost of capital of 12%? Explain the reasons.

8. (a) State the purpose of project analysis and your understanding about the details of project preparation and feasibility study with due regard to some emerging socio-environmental concerns. Explain the steps in the process of long-run manpower planning. **(19)**

(b) Explain the meaning and significance of (i) Payback period, (ii) First Year Rate of Return and (iii) Opportunity Cost of Capital.

Determine the internal rate of return for the project costing $ 1,000,000 with annual benefits of $ 100,000 for 25 years. **(16)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 B. Sc.. Examinations 2009-2010

Sub : **CE 401** (Project planning and 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 any **THREE** questions.

1. (a) A construction project consists of 18 activities represented by the network shown in Figure-1. The normal duration required to perform various activities of the project are given in the figure. Compute (i) event times, (ii) Activity time (EST, EFT, LST, LFT) (iii) total float. Also determine Critical Path/Paths. **(25)**

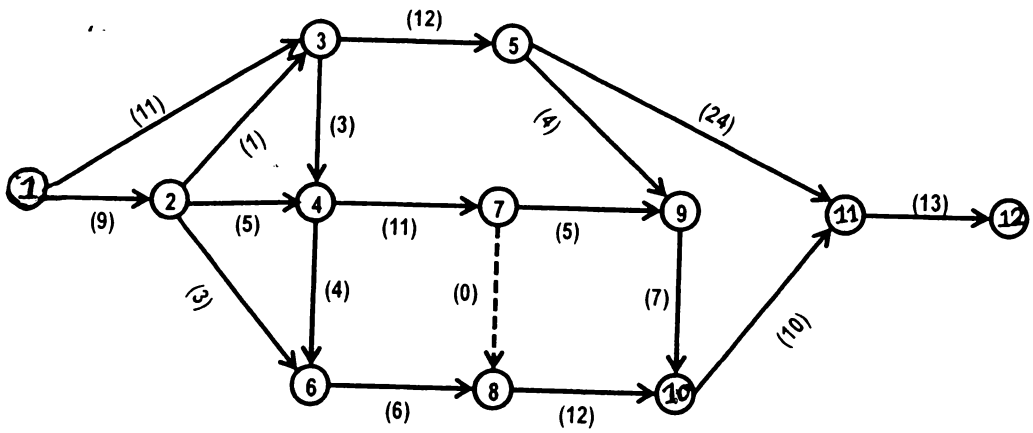


Figure - 1

(b) What are the functions of the following construction equipments? Cold-planer, Raker Jackhammer, TBM. **(4)**

(c) Say, you are the owner of a piece of land. You want to ask a contractor to build a residential building on that land. What method of compensation will you choose and why? **(6)**

2. (a) A construction company has an opportunity to submit a bid for the construction of a new appartment building. From the specifications provided by the developer, the RERT network along with the three time estimates (in week) for each activity are shown in Figure-2. Determine: **(22)**

(i) critical path and its Standard Deviation.

(ii) Probability of completing the work in 38 weeks.

(iii) Compute time duration for which the company should bid to provide 95% probability of completing the project in time.

Contd P/2

Contd ... Q. No. 2(a)

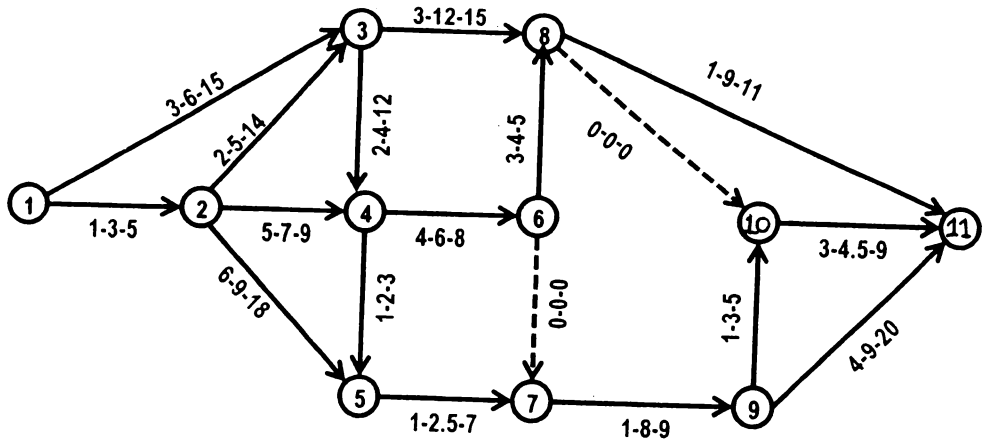


Figure-2

(b) Differentiate between "Forward planning", "Backwork planning" and "Combined planning". **(6)**

(c) Why is proper planning necessary before embarking of any project? **(3)**

(d) Say, you are thinking about investing "borrowed" money on a business project. You know that the bank interest rate on deposits is 12%, the cost of capital (interest on the borrowed money) is 10%, IRR of an alternate project is 15%. Considering no other uncertainties, what discount rate should you use for your NPV analysis and why? **(4)**

3. (a) The maintenance project of a building consists ten activities. The predecessor relationships are identified by their node numbers as indicated below: **(9)**

Activity	Identification	Activity	Identification
A	(1, 2)	F	(4, 5)
B	(2, 3)	G	(4, 7)
C	(2, 4)	H	(5, 8)
D	(3, 6)	I	(6, 8)
E	(3, 5)	J	(7, 8)

Draw the network diagram for the project

(b) What is a milestone chart? How does it differ from a bar chart? Explain, with the help of a suitable example, the method of preparing a bar chart. **(9)**

(c) Given an annual interest rate of 20%, what should be the equivalent quarterly interest rate for any cost benefit analysis? **(5)**

(d) Explain why accidents increases in Construction site in recent time. State the causes of fatal accidents in the construction industry. Explain application of Quality Control cycle to public works projects. **(12)**

Contd P/3

4. (a) What are the four assumptions in linear programming? XP windows has been contracted to deliver windows for homes over the next six months. The demands for each month are 110, 250, 180, 120, 240, and 120 units respectively. Production cost per window varies from month to month depending on the costs of labour, material and utilities. XP windows estimates the production costs per window over the next six months to be USD 50, 55, 45, 58, 52 and 50 respectively. To take advantage of the fluctuations in manufacturing costs XP Windows may elect to produce more than is needed in a given month and hold the excess units for delivery in later months. This, however, will incure storage costs at the rate of USD 10 per window per month assessed on end of month inventory. Develop a linear program to determine the optimum production schedule **(4+12)**

(b) List the information obtained from Resource Scheduling Method (RSM). Briefly explain how you determine the successor and predecessor activity among the conflicting activities in RSM. **(3+5)**

(c) Define an 'event' and an 'activity'. Differentiate clearly between the two. What do you understand by a 'Dummy'? What are its uses? Define "head event", "tail event", "dual role event", "successor activity" and "predecessor activity". **(11)**

SECTION – B

There are **FOUR** questions in this Section. Answer any **THREE** questions.

5. (a) Define and differentiate between administration and management and state different schools of thoughts in management. State the functions, steps and benefits of management organisation and the purpose and different forms of organisation structure. Explain the process of short-term and long-term man-power planning in an organisation. **(22)**

(b) Discuss the importance of understanding human needs and the principles of meeting such needs through organisation. List the factors in departmentation, delegation and influencing. **(13)**

6. (a) Define and discuss the framework and various approaches and theories of motivation. Explain the concept and importance of morale in the context of motivation. State the conditions that foster voluntary co-operation in the organisation and some important personality characteristics of a manager. **(20)**

(b) Define delegation, authority, power and influence and explain their interrelationships. State the necessity and key steps in delegation. State some guides and methods for disciplining and list the issues in collective bargaining. **(15)**

7. (a) Define engineering management and explain with examples the necessity of the study of management in Civil Engineering education and practices. Explain the tools that should be used for self management and state the wage and salary administration procedure. **(16)**

Contd P/4

CE 401

Contd ... Q. No. 7

(b) Define construction management and state the importance of construction site supervision and how would you organise supervision of a construction project. A road is 100 km, the tender sum is US $ 160 million and the construction period is four years. Assume that the project complexity is "fairly complex", estimate the approximate number of different categories of supervision staff (engineers, technicians, and sub-professionals) required to successfully implement the project. Draw a typical supervision organisational chart of the above project. Assume any reasonable values of the missing data if any. **(19)**

8. (a) What are the five phases of a project lifecycle? Draw the resource requirement diagram at different stages of Project lifecycle. **(5)**

(b) What are the four types of risks that you need to be aware of during project evaluation? Give an example of each. Name three nonnumeric measures for project evaluation, You are offered BDT 50,000 now or BDT 88,000 at the end of 3 years from now. Which one drill you prefer if the discount rate is 5% per quarter? Ignore uncertainties. **(14)**

(c) For a Civil Engineering project with the following cash flows, determine the IRR. If the going discount rate is 10%, will you accept this project? Why or why not. **(16)**

Year	0	1	2	3	4	5	6	7
Net cash flow (USD)	-1100	200	200	200	200	200	200	200

CE- 401

Table 1 Standard Normal Distribution Function

Z (+)	*Probability* (P_r)(%)	Z (−)	*Probability* (P_r) (%)
0	50·0	0	50·0
+0·1	53·98	−0·1	46·02
+0·2	57·93	−0·2	42·07
+0·3	61·79	−0·3	38·21
+0·4	65·54	−0·4	34·46
+0·5	69·15	−0·5	30·85
+0·6	72·57	−0·6	27·43
+0·7	75·80	−0·7	24·20
+0·8	78·81	−0·8	21·19
+0·9	81·59	−0·9	18·41
+1·0	84·13	−1·0	15·87
+1·1	86·43	−1·1	13·57
+1·2	88·49	−1·2	11·51
+1·3	90·32	−1·3	9·68
+1·4	91·92	−1·4	8·08
+1·5	93·32	−1·5	6·68
+1·6	94·52	−1·6	5·48
+1·7	95·54	−1·7	4·46
+1·8	96·41	−1·8	3·59
+1·9	97·13	−1·9	2·87
+2·0	97·72	−2·0	2·28
+2·1	98·21	−2·1	1·79
+2·2	98·61	−2·2	1·39
+2·3	98·93	−2·3	1·07
+2·4	99·18	−2·4	0·82
+2·5	99·38	−2·5	0·62
+2·6	99·53	−2·6	0·47
+2·7	99·65	−2·7	0·35
+2·8	99·74	−2·8	0·26
+2·9	99·81	−2·9	0·19
+3·0	99·87	−3·0	0·13

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L–4/T–1 B. Sc. Engineering Examinations 2008-2009

Sub : **CE 401** (Project Planning and 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 any **THREE**.

1. (a) List the information required for Resource Scheduling Method (RSM). Briefly explain the theory of RSM. **(3+4)**

   (b) Given the circle network in Figure-1 and other required information in Table-1, develop a feasible plan and schedule using RSM. **(18)**

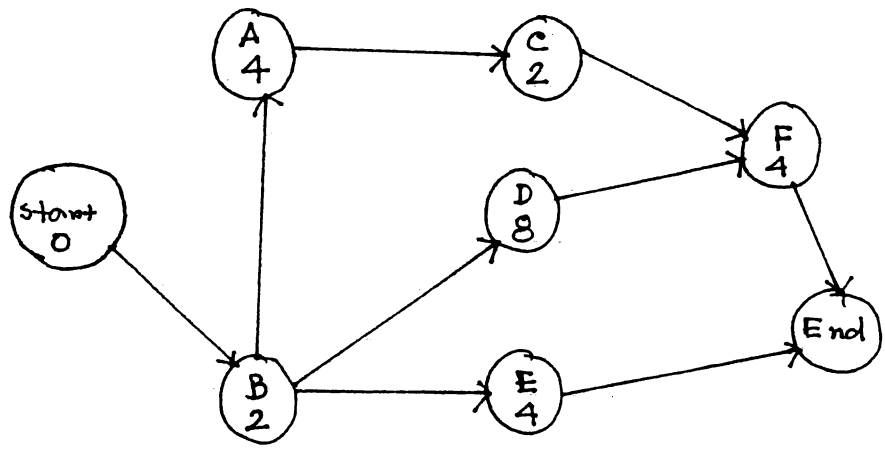


FIGURE-1 : CIRCLE NETWORK

(ACTIVITY DURATION IN DAYS)

Table-1

Activity	Duration (days)	Required No. of Pavement Engineer	Required No. of Traffic Engineer
A	4	1	2
B	2	0	3
C	2	2	0
D	8	1	0
E	4	3	0
F	4	1	2

Maximum amounts of available manpower.

--- Pavement Engineer (4)

--- Traffic Engineer (3)

(c) Explain in brief the difference between PERT and CPM Networks. What are the short comings of Bar charts? How are these removed? **(10)**

2. (a) A PERT network is shown in Figure-2. Calculate the probability that (i) The activity 3-6 will be completed in a schedule time of 7 days (ii) The project will be completed in a schedule time of 21 days. **(20)**

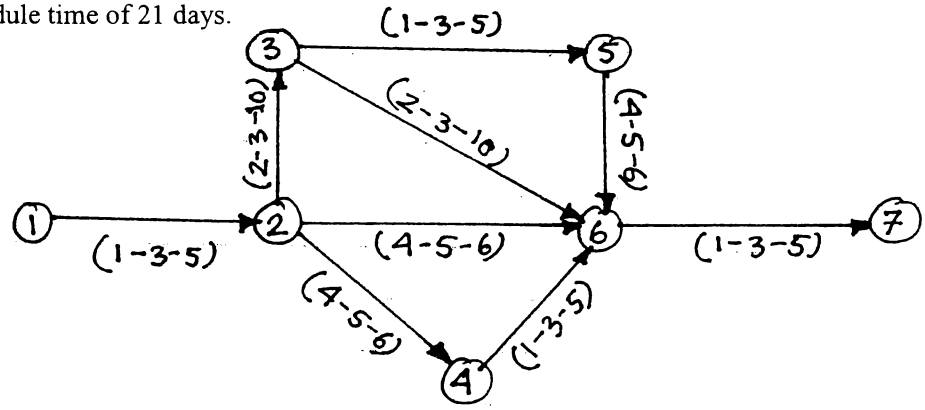


FIGURE-2

(b) A project consists of six activities designated from A to F, with the following relationships: **(8)**

- A is the first activity to be performed
- B and C can be done concurrently, and must follow A
- B must precede D
- E must succeed C, but it cannot start until B is completed
- The last activity F is dependent on the completion of both D and E.

Draw the network diagram.

(c) From the network diagram shown in Figure-3, establish the relationships among the activities. **(7)**

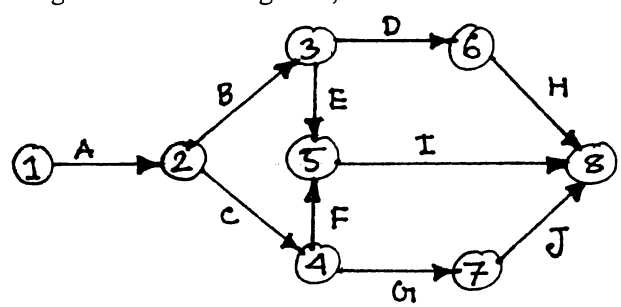


FIGURE-3

3. (a) Analyze the CPM network shown in Figure-4. Tabulate the event time, activity time and Total Float. Identify the critical activities and the critical path (on paths). Note that the value shown in brakets indicate activity duration in days. **(23)**

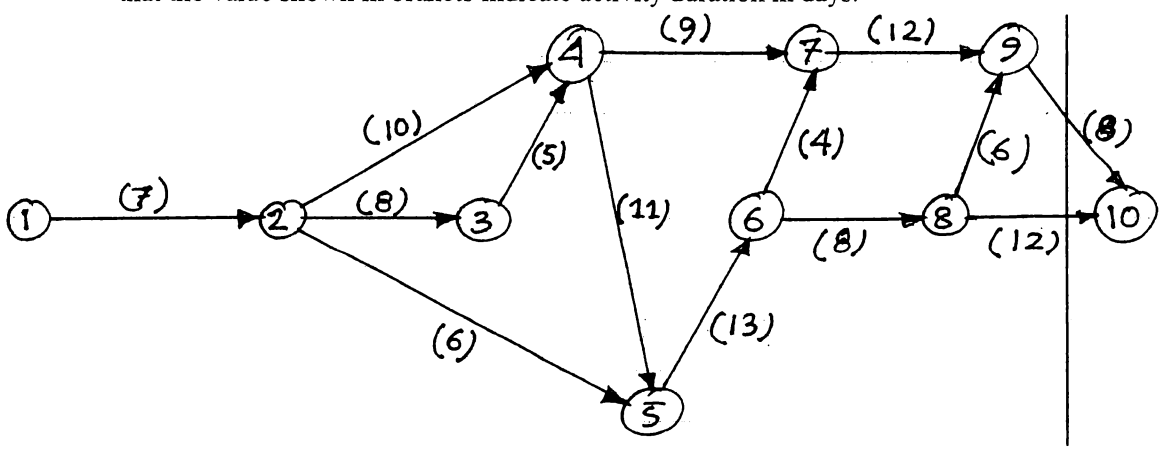


FIGURE-4

(b) Write short note on **(3×4=12)**

(i) Safety in Construction

(ii) Construction Quality Control

(iii) Ability to influence Construction Cost over time.

4. (a) BUET has decided to contract students to do errands such as answering the phones and typing. The need for such service fluctuates during work hours (8 AM to 5 PM). In the Civil Engineering Department, the minimum number of students needed is 2 between 8 AM and 10 AM, 3 between 10:01 AM and 11 AM, 5 between 11:01 AM and 1 PM and 3 between 1:01 PM and 5 PM. Each student is allotted three consecutive hours (except for those starting at 3:01 PM who work for 2 hours and those who start at 4:01 PM who work for 1 hour). Because of their flexile schedule, students can usually report to work at any hours during the work day, except that no student wants to start working at lunch time (12 noon). Formulate an LP problem to determine the minimum numbers of students the Department should employ and to determine the time of the day at which they should report to work. **(18)**

(b) As a project engineer for a civil engineering project, why would you want to plan ahead before the actual work starts? **(5)**

(c) What are the different elements that need to be planned ahead of the project implementation? **(5)**

(d) Do you think financial feasibility should be sufficient to judge the desirability of a large Civil Engineering project? Why or why not? **(7)**
In a feasibility report, where it is written that the IRR will vary with the assumed discount rate, is this a correct statement? Why or why not?

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Explain the significance and emerging role of management knowledge and leadership functions in Civil Engineering practices. Discuss the concepts of creation of jobs and departmentation and explain the factors in decentralization and span of control. What are the steps in matching jobs and individuals in an organisation? **(18)**

(b) Define management organisation and explain its essential principles. Discuss the advantages and disadvantage of line organisation and the problems in using a staff man in the line and staff organisation. State the wage and salary administration procedure and the guides for leader's behaviour. **(17)**

6. (a) Define and discuss management, management process and its functions and activities. State different approaches to management and the development of management theories. Explain the meaning and delegation of authority and responsibility and list some positive and negative outcomes of conflicts. **(19)**

(b) Explain the concept and importance of motivation. Give your understanding and classification of human needs. Discuss briefly the process of influencing, disciplining and rewarding in the contest of motivation. **(16)**

Contd P/4

CE 401

7. (a) Define and explain the tasks of project management, construction management and site management. Enumerate both contractual and financial problems that affect successful implementation of projects and explain time critical operations. Write short notes on construction economy. **(22)**

   (b) State the functions and scope of stores and materials management. Name four different types of mechanized equipment used for excavation in construction. **(7)**

   (c) Give an example where " Prices" in the market does not reflect the true "resource cost" and mention whether the true cost in larger or smaller than the market price. When would you prefer cost effectiveness ahead of other project evaluation measures? **(6)**

8. (a) A civil engineering project has a BDT 1 million capital cost at the beginning of the project. The project proponents calculate that there is a 40% probability that annual revenue will be BDT 200,000 and a 60% probability that it will be BDT 180,000. They also calculate that there is a 60% probability that the project will run for 10 years, and a 40% probability that the project will run for 8 years. Considering these risks, what is the expected NPV from this project? **(22)**

   (b) Discuss the significance of discount rate in project evaluation. Given the quarterly discount rate of 5%, what would be the annual interest rate? **(8)**

   (c) What are the advantages of "Unit" method of compensation in contracts? **(5)**

CE-401 Q2(a)

Table . Standard Normal Distribution Function

Z (+)	Probability (P_r)(%)	Z (−)	Probability (P_r) (%)
0	50·0	0	50·0
+0 1	53·98	−0·1	46·02
+0·2	57·93	−0·2	42·07
+0 3	61·79	−0·3	38·21
+0·4	65·54	−0·4	34·46
+0·5	69·15	−0·5	30·85
+0·6	72·57	−0·6	27·43
+0 7	75·80	−0·7	24·20
+0·8	78·81	−0·8	21·19
+0 9	81·59	−0·9	18·41
+1 0	84·13	−1·0	15·87
+1·1	86·43	−1·1	13·57
+1·2	88·49	−1·2	11·51
+1·3	90·32	−1·3	9·68
+1·4	91·92	−1·4	8·08
+1·5	93·32	−1·5	6·68
+1·6	94·52	−1·6	5·48
+1·7	95·54	−1·7	4·46
+1·8	96·41	−1·8	3·59
+1·9	97·13	−1·9	2 87
+2·0	97 72	−2·0	2·28
+2·1	98·21	−2·1	1·79
+2·2	98·61	−2·2	1·39
+2·3	98·93	−2·3	1·07
+2·4	99·18	−2·4	0·82
+2 5	99·38	−2·5	0·62
+2 6	99·53	−2·6	0·47
+2 7	99·65	−2·7	0·35
+2·8	99·74	−2·8	0·26
+2·9	99 81	−2·9	0·19
+3·0	99·87	−3·0	0·13

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 B. Sc. Engineering Examinations 2007-2008

Sub : **CE 401** (Project Planning and Management)

Full Marks : 210 Time : 3 Hours

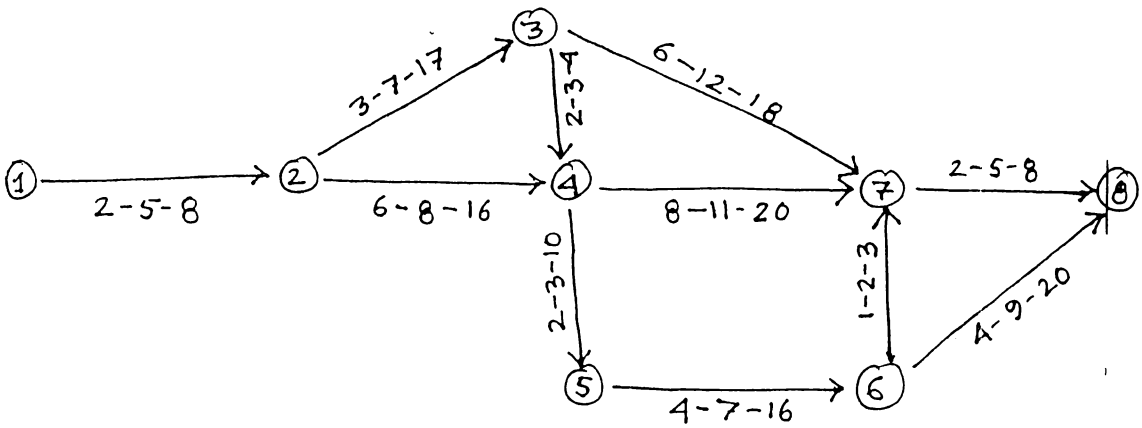
The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this Section. Answer any **THREE.**

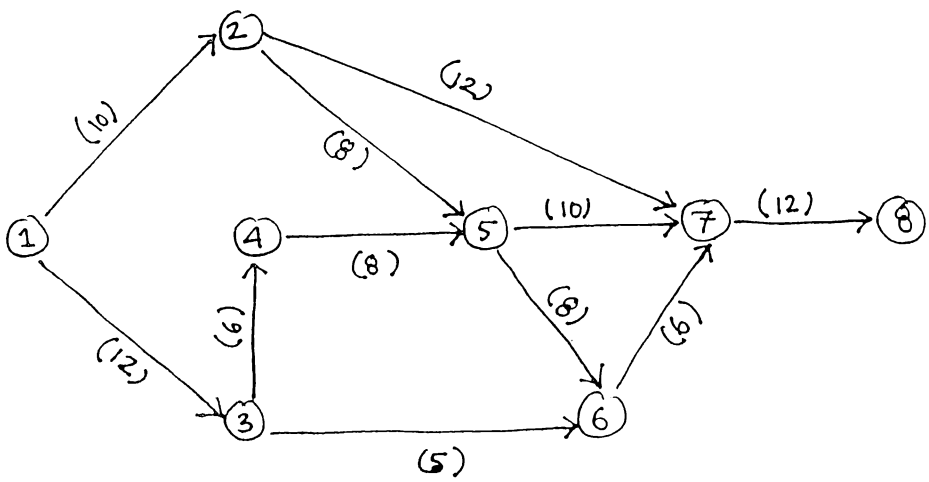
1. (a) For the network of a construction project shown in Fig. 1 determine (i) critical path and its standard deviation, (ii) probability of completion of project in 46 days. **(27)**



(figure-1)

(b) Explain the project management cycle. List the shortcomings of bar charts. **(8)**

2. (a) Analyze the CPM arrow network shown in Fig. 2. Tabulate the results, identify the critical activities and the critical path (or paths). Note that the value shown in brackets indicate activity duration in days. **(27)**



(figure-2)

Contd P/2

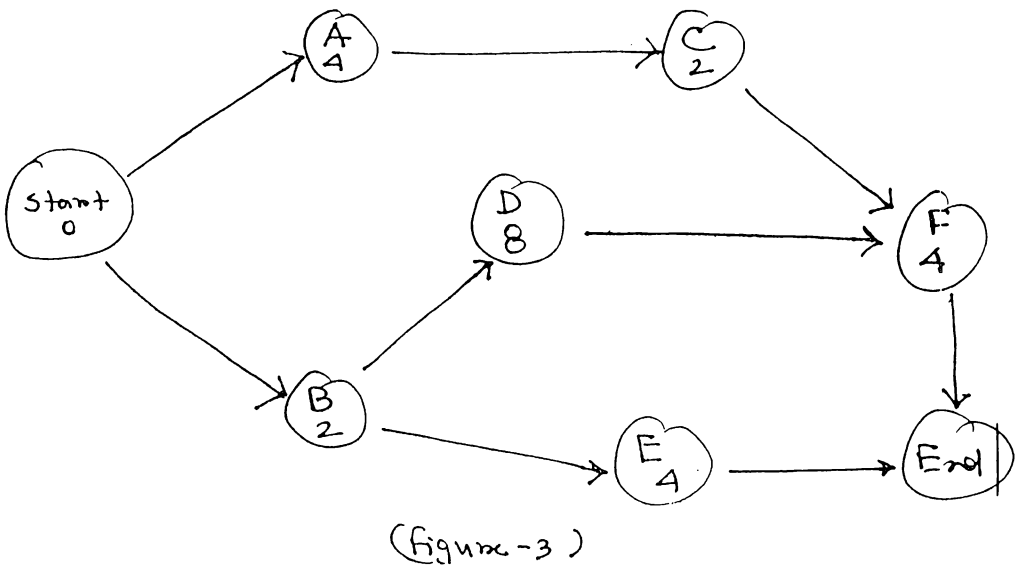
CE 401

Contd ... Q. No. 2

(b) Draw a network diagram for the project having 9 activities, with the following inter-relationships: **(8)**

- C follows D but precedes F.
- C follows B but precedes H.
- G follows F but precedes I.
- E follows A but precedes I.
- D follows A
- H and I terminates at the same time
- A and B start at the same time.

3. (a) Given the circle network in Fig. 3 and other required information in Table-1. Develop a feasible project plan and schedule using RSM. **(20)**



(Figure-3)

Circle network (activity duration in days)

Table : 1

Activity	Duration (days)	Required No. of plumbers	Required No. of Rod workers
A	4	1	2
B	2	0	3
C	2	2	0
D	8	1	0
E	4	3	0
F	4	1	2

Maximum available resources: No. of plumbers = 4

No. of Rod workers = 3

Contd ... Q. No. 3

(b) Define optimistic time estimate, pessimistic time estimate and Most likely time estimate. The network for a project is shown in Fig. 4. Determine the expected time for each path. Which path is critical? **(15)**

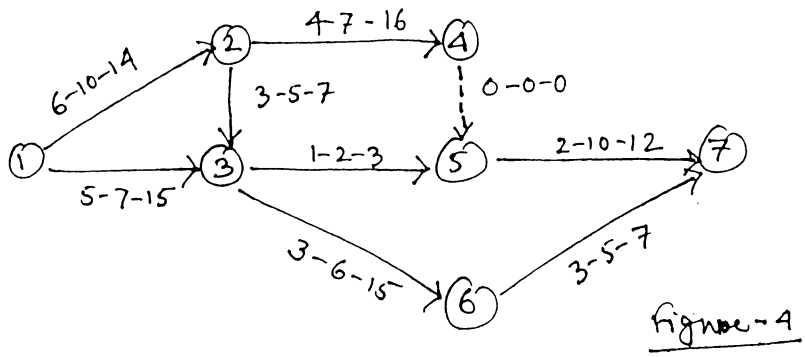


figure-4

4. (a) Enumerate the items that generally constitute the contractual documents for construction projects. Explain Unit price Contract and the necessity for the success of Lump-sum Contract. Explain unbalanced bid and its implications. **(17)**

(b) State the importance and the typical procedure for pre-qualifications of contractors. **(18)**

Explain the following:

(i) Organisation and characteristics of good Site Supervisor

(ii) Development Project Proforma (DPP)

(iii) Departmentation and Delegation

SECTION – B

There are **FOUR** questions in this Section. Answer any **THREE.**

5. (a) Define and classify management. How does administration differ from management? Explain management as a "meta process". State the dimensions, importance and limitations of planning. **(18)**

(b) What is meant by motivation? Discuss McGregor's theories and various principles connected with motivation. Explain the concept and importance of morale in the context of motivation. **(17)**

6. (a) State the objectives and functions of construction management. Briefly explain the accident causes, safety measures and strategy of safety campaigns at construction work sites. **(12)**

Contd P/4

Contd ... Q. No. 6

(b) Discuss the importance of management knowledge and interpersonal skills in civil engineering practices. What are the four important topics which need to be fostered in management education for Civil Engineering? **(23)**

Write notes on :

(i) Wage incentives and issues of collective bargain

(ii) Line and staff organisation

(iii) Scope of quality control in construction

7. (a) Define and discuss the process of leading, directing and guiding. State some of the leadership functions, attitudes and qualities. Explain the process of issuing orders. Differentiate between authority and power. **(17)**

(b) On most university campuses, students are contracted to do errands. The need for such service fluctuates during work hours (8 am to 5 pm). In the CE department, the minimum number of students needed is 2 between 8 am and 10 am, 3 between 10:01 am and 11 am, 4 between 11:01 am and 1 pm, and 3 between 1:01 pm and 5 pm. Each student is allotted three convective hours (except for those starting at 3 :01 pm who work for 2 hours and those who start at 4:01 pm who work for 1 hour). Because of their flexible schedule, students can usually report to work at any hour during the work day, except that no student wants to start working at lunch time (12 noon). Formulate an lp problem to determine the minimum number of students the CE department should employ and to determine the time of the day at which they should report to work. **(18)**

8. (a) What is the significance of discount rate in taking actions now to mitigate greenhouse gas emissions? **(6)**

(b) Once a cement factory is in production, it will produce cement valued at Tk. 2,000,000 annually over the economic life of the factory, estimated to be 12 years. **(20)**

(i) What is the present value of the cement production, if the discount rate is 4% per quarter? (ii) What will be the expected present value if there is a 30% probability that the discount rate will be 3% per quarter and 70% probability that it will be 4% per quarter?

(c) Do you think technical and financial feasibility should be sufficient to judge the desirability of a large civil engineering project? Briefly explain with examples. **(9)**

CE-401 Q 1(a)

Table . Standard Normal Distribution Function

Z (+)	*Probability* (P_r)(%)	Z (−)	*Probability* (P_r) (%)
0	50·0	0	50·0
+0·1	53·98	−0·1	46·02
+0·2	57·93	−0·2	42·07
+0·3	61·79	−0·3	38·21
+0·4	65·54	−0·4	34·46
+0·5	69·15	−0·5	30·85
+0·6	72·57	−0·6	27·43
+0·7	75·80	−0·7	24·20
+0·8	78·81	−0·8	21·19
+0·9	81·59	−0·9	18·41
+1·0	84·13	−1·0	15·87
+1·1	86·43	−1·1	13·57
+1·2	88·49	−1·2	11·51
+1·3	90·32	−1·3	9·68
+1·4	91·92	−1·4	8·08
+1·5	93·32	−1·5	6·68
+1·6	94·52	−1·6	5·48
+1·7	95·54	−1·7	4·46
+1·8	96·41	−1·8	3·59
+1·9	97·13	−1·9	2·87
+2·0	97·72	−2·0	2·28
+2·1	98·21	−2·1	1·79
+2·2	98·61	−2·2	1·39
+2·3	98·93	−2·3	1·07
+2·4	99·18	−2·4	0·82
+2·5	99·38	−2·5	0·62
+2·6	99·53	−2·6	0·47
+2·7	99·65	−2·7	0·35
+2·8	99·74	−2·8	0·26
+2·9	99·81	−2·9	0·19
+3·0	99·87	−3·0	0·13

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 B. Sc. Engineering Examinations 2006-2007

Sub : **CE 401** (Project Planning and 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 any **THREE**.

1. (a) Explain why planning is necessary. Describe various steps for planning a project. **(8)**

(b) Briefly explain the construction economy and discuss some possible ways in which the engineers and contractors could deduce the cost of the construction project. List and define the most commonly used criteria/measures for economic appraisal of projects. **(15)**

(c) A project consists of 9 activities with their times of completion as follows : **(12)**

Activity	A	B	C	D	E	F	G	H	I
Duration (weeks)	2	4	2	4	6	4	5	4	3

The precedence relationships are as follows :

→ A and B can be performed in parallel

→ C and D cannot start until A is completed

→ E cannot start until half the work of activity C is completed

→ F can start only after activity D is completed

→ G succeeds C

→ Activity H should succeed activity E

→ I is the last activity, which should succeed F.

(i) Draw the bar chart

(ii) What is the total time of completion of the project?

2. (a) Define Event, Activity, Head Event, Tail Event, Dual role Event, Successor Event, Predecessor Event, Parallel activities, Serial activities and Dummy. **(10)**

(b) Define CPM and PERT. Compare CPM with PERT. **(8)**

(c) A project consists of eight events having predecessor relationships as under. **(10)**

Event	Immediate predecessor	Event	Immediate predecessor
1	--	5	3, 4
2	1	6	3, 5
3	1	7	6
4	2, 3	8	4, 7

Draw the network.

33

Contd P/2

(d) State the interrelationships among the activities from the following network diagram (Figure – 1). **(7)**

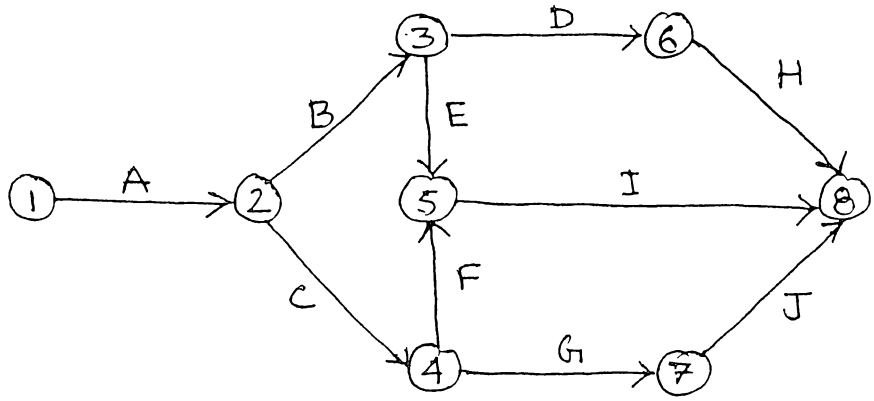


Figure-1

3. (a) Define "Optimistic time estimate", "pessimistic time estimate" and "Most likely time estimate". **(4)**

(b) The time estimates for three activities A, B and C are as follows : **(6)**

Activity	Optimistic time	Most likely time	Pessimistic time
A	10	12	14
B	6	8	12
C	5	10	12

Determine expected time and variance for each activity. Which activity has more reliable time estimates.

(c) Analyze the CPM arrow network shown in Figure–2. Tabulate the results, identify the critical activities and the critical path (or paths). Note that the data shown in Brackets indicate activity duration in days. **(25)**

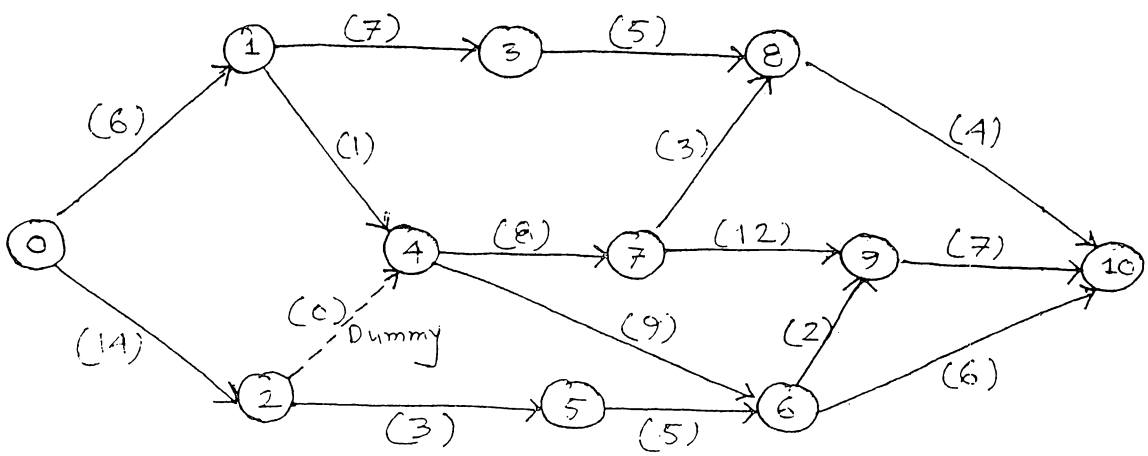


Figure-2

4. (a) Define RSM. What information are required to implement RSM? Explain theory of RSM. **(8)**

(b) The network for a certain project is shown in Figure–3. Determine the expected time for each of the path. Which path is critical? **(12)**

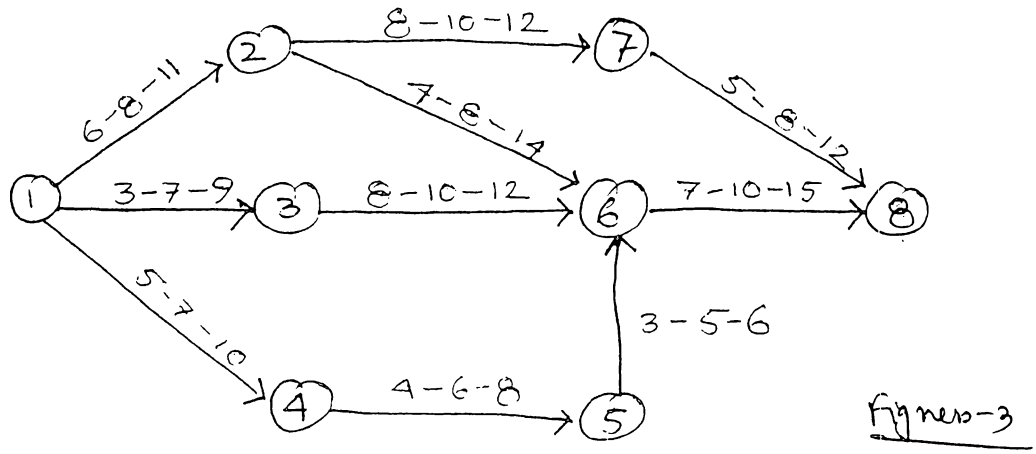


Fig no-3

(c) Explain the standard form of Linear programming. What are the assumptions related to LP? A small electronic company produces two products P_1 and P_2. To produce both products 3 types of machine M_1, M_2 and M_3 are required. The production manager's job is to produce the optimal combination of products P_1 and P_2 that maximizes profit margin and use the machine M_1, M_2 and M_3 most efficiently. Write down the standard form of LP to maximize profit. **(15)**

Machine	No of hours required per unit		Capacity of Machine (hours)
	P_1	P_2	
M_1	6	4	20
M_2	3	5	18
M_3	7	4	22
Profit margin	Tk. 25	Tk. 30	

SECTION – B

There are **FOUR** questions in this Section. Answer any **THREE**.

5. (a) Briefly explain the function, steps and benefits of management organization. Discuss various elements of the process of management with particular reference to specific activities. State your understanding of the scope and significance of management studies in Civil Engineering. **(17)**

Contd P/4

(b) Explain the importance of the study of human factors in management. Briefly outline the concept, approaches and theories of motivation. State the conditions that foster voluntary co-operation. **(18)**

6. (a) Define the terms "project management", "construction management" and "site management". Briefly explain the need for inspection and quality control in construction works and the concept and uses of control charts. List some safely measures for hot-bituminous works. **(15)**

(b) Explain clearly what is meant by a project and its activities. Discuss the various phases and aspects of project preparation. Briefly summarise the various components of a feasibility report. **(20)**

7. (a) Define an discuss the significance of Sinking Fund Factor, Annuity Factor and the First Year Rate of Return. Define and differentiate between Internal Rate of Return and Crossover Discount Rate. **(25)**

Two alternative machines are being considered in order to reduce operating costs. The installed cost of machine X is $ 75,000, while the installed cost of machine Y is $ 65,000. The capacities of the two machines are virtually identical. The anticipated annual cost savings of machine X and machine Y are $ 14,000 and $ 13,000 respectively. The useful life of each machine is 10 years (salvage value is assumed to be negligible). At discount rate of 8 percent, which of the two machines is preferable using the net present value criterion? What is the Internal Rate of Return on the investment if machine Y is selected? Necessary assumption could be made if needed.

(b) Briefly explain the most common problems that are responsible for project implementation falling behind schedule. State some specific measures that could limit such shortcomings. **(10)**

8. (a) Define and discuss the delegation and authority relationship. State the necessity and key steps in delegation. List the factors which should be taken into consideration in the following : **(15)**

(i) Delegation, (ii) Departmentation and (iii) Span of control.

(b) Define human needs and give a detailed classification of such needs in the context of motivation. Discuss the principles of meeting human needs through organization. Define and discuss briefly the process of influencing and disciplining. List some positive and negative outcomes of conflicts. **(20)**
