

TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BEL, BAG, BGE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

*Subject: - Project Engineering (CE 701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Discuss citing project characteristics. How a project can be differentiated from other permanent systems? [5]
2. Mention project life cycle and discuss various activities carried out in each phase of a project. [6]
3. Define bilateral, multilateral and joint venture project. Explain the major elements that influence the external environment of a project. [3+4]
4. Explain the necessity of an appraisal in a project. Explain in detail the techniques of project formulation. [4+4]
5. What is dummy activity? Write down the use of critical path in a CPM network diagram. Find all the components of CPM from the following information. Use AOA method. [1+3+13]

S.N.	Activity	Duration (week)	Predecessor
1	A	1	-
2	B	3	-
3	C	2	A, B
4	D	5	B
5	E	3	B
6	F	1	C, D
7	G	3	D
8	H	4	D, E
9	I	5	F, G, H

6. Define resource leveling and smoothing? Prepare a 4 level WBS of any engineering project of yours interest. [2+4]
7. As a project manager how will you control the project during implementation phase? Explain with an aid of project control cycle. [6]
8. A project has a planned budget of Rs. 30,00,000 and schedule of 24 months. During its implementation you have monitored the following data: Perform EVA and comment on the performance and also draw S-curve to forecast the final completion budget and schedule. [8]

Months	5	10	15	20
Work completed	20%	45%	60%	70%
Actual Expenditure (Rs)	7,00,000	13,00,000	20,00,000	24,00,000

Or,

How EVA is used in controlling cost of a project during project implementation. Explain EVA with 3 different examples requiring different approach in control.

9. Define project risk management. What is qualitative and quantitative risk analysis? What are the major steps that you take in managing risks? [2+6+4]
10. What is capital budgeting? Explain its features. [2+3]



TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCE, BEL, BAG, BGE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering (CE 701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) What is project? Explain its dimensions and characteristics. [2+5]  
b) Explain different environments within which a project need to be conducted. [5]
2. a) Why project appraisal is necessary for initiating a project? What are the major aspects that needed to be considered for carrying out the appraisal of a hydropower project? Discuss. [2+6]  
b) Explain in detail the procedure for developing the project proposal. [6]
3. a) Why schedule is important in planning a project? Find all the components of CPM from the following information. Use AOA method. [3+14]

S.N	Activity	Duration (month)	Predecessor	Successor
1	A	1	-	C, D
2	B	3	-	E
3	C	2	A	F, G
4	D	2	A	H
5	E	5	B	I, J, K
6	F	1	C	I
7	G	3	C	I, J, K
8	H	3	D	I, J, K
9	I	5	E, F, G, H	L
10	J	1	E, G, H	L
11	K	4	E, G, H	M
12	L	1	I, J	-
13	M	2	K	-

- b) Prepare a bar chart of an irrigation project mentioning at least 6 activities. Also show the milestones in a chart. [7]
4. a) What is project control cycle? Explain it with elements of control. [2+4]  
b) Perform EVA on the basis of following given information of "Earthquake Affected Monasteries Reconstruction Project" (EMRP) which was monitored after 6 months of its implementation. State controlling statements on the basis of your evaluation. [8]

Descriptions of project	Standard (Budget/Plan) information	Descriptions of project	Monitored information regarding progress (Completed)
1. Number of monasteries to be reconstructed	753 units	1. Reconstructed monasteries	179 units
2. Reconstruction project to be completed in	30 months	2. Average expended reconstruction cost per unit	Rs. 7.8 millions
3. Average reconstruction cost per unit	Rs. 9.3 millions		

5. a) Define risk, its types and sources. As a project manager how would you rectify the possible risk on your project? Give your answer considering all possible steps falls under Risk Management. [10]  
b) What are the sources of project finance? A project has an initial investment of Rs. 3,00,000 which gives annual return of Rs. 50,000 for 8 years. The salvage value after 8 years will be Rs. 10,000. Make your investment decision based on ARR, Payback period, IRR and Profitability index (PI) method. [2+4]

TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2076 Ashwin

Exam.	Back		
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Programme	BCE, BEL, BAG, BGE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering (CE 701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. a) Define project. Explain the how technology and capital can be transferred in a joint venture project with a suitable example? [2+4]
- b) Differentiate between a goal and objective of the project. Explain goal setting criteria of a project with a suitable example. [2+6]
2. a) Write down three number of objectives and three number of limitations of any project proposal. Explain a good project proposal should give answer of which types of questions. [3+3]
- b) Differentiate between project appraisal and project formulation. Explain in details about techniques of project formulation. [2+4]
3. a) Define Work break down Structure (WBS) with example specifying levels and code. [8]
- b) Draw network diagram. Compute EST, EFT, LST, LFT, TF, FF, interfering float and independent float. Write down the significance of calculating total float in network analysis. [16]

Activity	A	B	C	D	E	F	G	H	I
Predecessor	-	A	A	A	B	C	D	C, E	F, G
Successor	B, C, D	E	F, H	G	H	I	I	-	-
Duration (day)	5	4	2	3	2	1	3	1	2

4. a) Define monitoring, evaluation and controlling. What are the major difficulties faced by a project manager in implementing the project control system in Nepal. [3+5]
- b) 50 units of plantation have to be done in 3 weeks period. Per unit cost of plantation is estimated as Rs 2500 of which progress monitoring was done 1 week after the work was started. Only 20 units of plantation was found completed and the account record showed that the actual expenditure per unit was Rs 2500. Perform EVA and comment on the performance. [6]
5. a) Define project risk. Write down tools and techniques used for risk identification in a project. As being a engineering student, how do you carry out risk response planning. [2+4+4]
- b) Is preference shares are sources of project finance? Explain it. Explain about the determinants of capital structure decision made in any business firm. [2+4]

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Exam.	Regular		
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Programme	BCE, BEL, BGE B. Agri.	Pass Marks	32
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**Subject: - Project Engineering (CE701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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1. a) Describe that the specified job/task is a project? Write the major activities carried out in the implementation phase of a project? [4+4]
- b) Explain in detail the project operates in dynamic environment. [8]
2. a) Write various analysis to be carried out for project appraisal. [8]
- b) Explain in details about the contents of writing a good project proposal. [8]
3. a) Draw CPM network diagram and compute EST, EFT, LST, LFT, TF, FF, Int.F and IF from the information given below. Compute project duration and mark the critical path. [12]

Activity	A	B	C	D	E	F	G	H	I
Duration (week)	3	2	0	4	7	5	8	6	1
Predecessor	-	-	A	A	B,C	B,C	D,E	F	G,H

- b) Explain total float and independent float. [4]
4. a) Explain project control cycle and write the factors that should be considered during the quality control of a project. [4+4]
- b) 50 units of plantation have to be done in 4 weeks period. Per unit cost of plantation is estimated as Rs. 200 of which progress monitoring was done 3 weeks after the work was started. Only 60% work was found completed and the account record showed that the actual expenditure for plantation per unit was Rs. 300. Perform EVA and comment on works. [8]
5. a) Define risk and its types. How could you manage risk in a project effectively? Justify with risk management cycle. [2+6+2]
- b) What are the sources of project finance? A firm has equity capital consisting of 5000 ordinary share@ Rs 100 per share and Rs. 3,00,000 preference share at 12% interest per year and Rs 2,00,000 loan at 10% interest per year. If firm's earning before interest and tax is Rs 3,50,000 and tax rate applicable is 25% determine earning per share and book value. [6]

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- ✓ Attempt All questions.
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- ✓ Assume suitable data if necessary.

1. a) Explain the importance of project appraisal. Differentiate between technique and finance proposal of a project. [8]
- b) Discuss the techniques of project formulation. [8]
2. a) Explain project appraisal and its importance. [8]
- b) Describe the essence of writing a good proposal. [8]
3. a) Draw CPM network diagram and compute ES, EF, LS, TF, FF, Int.F and IF from the information given below. Also compute project duration and mark the critical path. [12]

Activity	A	B	C	D	E	F	G	H	I
Duration (week)	5	4	0	6	7	8	6	3	2
Predecessor	-	-	A	A	B,C	B,C	D,E	F	GH

- b) Write the advantages of Bar chart. [4]
4. a) What would be the impact on project due to unmanaged risk in project? Write down risks in project in different phases of project life cycle. [8]
- b) Explain and justify that risk transfer and risk reduction are techniques of risk response planning in any project. [8]
5. a) Explain project control cycle and write the factors to be considered during quality control of a project. [8]
- b) Describe project finance. Capital structure of a firm consists of 500 ordinary share @ Rs 100/share and 300 preference share @ Rs 100/share at 15% interest per year. Firm has a loan of 30,000 @ 12% per year firms earning before interest and tax is 40,000. Determine earning per share and book value. Tax rate = 40% [8]

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FSU 2073

1. a) Define project. List out all characteristics of project. [2+3]
- b) Define project environment. Explain external environment with example. [1+4]
2. a) Why do we prepare project proposal? Explain the process of writing project proposal. [1+5]
- b) List out all techniques of project formulation. Briefly discuss the methods of feasibility analysis. [2+6]
3. a) Prepare a bar chart of any engineering project consisting of at least 6 activities. [5]
- b) Find all components of given CPM network. [13+2]

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Durations	3	4	3	5	3	4	2	4	2	5	7	2
Predecessors	-	-	A	B	B	A,D	A,D	C	C	F,H,I	F,I	E,F,G,I
Successors	C,F,G	D,E	H,I	F,G	L	J,K,L	L	J	J,K,L	-	-	-

What is significance of critical path analysis?

4. a) Most of the construction projects in Nepal have poor project implementation with time and cost overrun. Justify your answer highlighting the points on causes of project delay. [5]
- b) Define quality and Discuss on its control techniques. [1+3]
- c) Suppose you are making brick for construction work. Suppose the following are your plan.

Project Plan:

- 5 hours to make a total of 1000 bricks
- Budgeted cost per brick is \$ 0.05
- Total budget is \$ 50.00 for brick ingredients (or \$ 10/hr)

Progress report at end of 1<sup>st</sup> hour

- 150 bricks have been made
- Total actual cost of ingredients used for 150 bricks is \$ 9.00

Use earned value to examine progress and also comment on performances. [6]

5. Define Risk and Project Risk. Briefly explain the types of project risk. How could you manage the risk in a project effectively? Justify with risk management cycle. [2+2+6]



6. a) Define the term capital budgeting decision. A five years project has initial investment of Rs.1,00,000 with Rs.40,000 salvage value. The average gross income of five years is calculated as Rs.18000. Calculate ARR of project if tax applicable is 50%. Depreciation is straight line.

[1+3]

b) List out features of sound capital structure. A firm has equity capital consisting of 3000 ordinary share @ Rs 100 per share, Rs.3,00,000 preference share at an interest of 12% per year and loan of Rs.9,00,000 borrowed at an interest rate of 10% per year. The firm wants to raise Rs.15,00,000 more to finance its investment and is considering two alternative methods of financing i.e.

(i) To issue 4,000 common shares @ Rs. 100 each, 5,00,000 preference share @ 12% and to borrow Rs.6,00,000 at 10% interest and

(ii) To issue 3000 common shares @ Rs.100; to issue 4,00,000 preference share at an interest rate of 12% and to borrow Rs.8,00,000 at 10% interest.

If the firm's earnings before interest and tax is Rs.5,00,000 and the tax rate applicable is 25%, determine earning per share to decide on the best alternatives.

[2+5]

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**Subject: - Project Engineering (CE701)**

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1. a) Define and Describe Joint Venture Project and Possibility of Technology Transfer through. [1+4]
  - b) What is Project Environment? How does political environment affect project in Nepal? [1+4]
  2. a) Describe the importance of project appraisal. Explain the difference between Economic Appraisal and Financial Appraisal. [2+4]
  - b) Define Project Proposal. Differentiate between Technical Proposal and Financial proposal. How does client evaluate the proposal for awarding the contract of Construction and Consulting works? [1+2+3]
  3. a) Define Project plan. Explain the advantages of planning Engineering Projects. [1+3]
  - b) Define Total Float, Free Float and independent float. Draw a CPM network and Find EST, EFT, LST, LFT, TF, FF, IntF and IndF. Show critical path also. [16]
- | Activity      | A       | B | C       | D | E | F | G | H | I | J |
|---------------|---------|---|---------|---|---|---|---|---|---|---|
| Successor     | B, C, D | E | F, H, I | G | H | J | I | J | J |   |
| Duration-Days | 2       | 3 | 4       | 5 | 4 | 3 | 2 | 1 | 2 | 3 |
- c) Define resource schedule. Differentiate between resource levelling and resource smoothing. [4]
  4. a) Define Monitoring and Evaluating. Explain project control cycle with suitable example. [1+5]
  - b) Define quality. Differentiate between quality assurance and quality control. As a site engineer what steps would you follow to control quality? [1+2+3]
  5. a) Define project risk. Differentiate between internal and external risks. What are the sources of internal risks in Nepal in the present context? Explain internal risks for the implementation of hydropower project in Nepal. [1+2+2+2]
  - b) Define Risk Management. Describe the steps of risk management. [1+4]
  6. a) Define Project Finance. What are the features of sound and appropriate capital structure? A company has total Capital of Rs 1500000 which consists of Rs. 400000 shares, Rs. 200,000 preference share issued at 12% interest per year and Remaining loan issued @ 8% interest. Calculate EPS if earnings before interest and tax in a year is Rs 300,000 and tax rate is 20%. [1+2+2]
  - b) Define Capital Budgeting and explain its importance. What are the methodologies of evaluating projects financially and Which method is most reliable? [1+2+2]



Exam.	New Back (2066 & Later Batch)		
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Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering (CE701)**

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1. a) Discuss project phases and life cycle giving examples of activities carried out in different phases and stages of life cycle. [10]

**OR**

Classify project and discuss its characteristics in detail including the importance of good project environment.

2. Define project proposal. A well prepared project proposal should give answer of what types of question, explain it. Discuss elaborately about different aspect to be considered in feasibility study of a road project. [2+2+5]
3. a) List down planning tools used in any project. Milestones chart is improved version of a bar chart, Justify it, with example. Explain WBS. [2+4+2]
- b) Draw a network diagram and find out EST, EFT, LST, LFT, TF, FF independent float, interfering float, project completion time of a building project having following details. What is the significance of critical path in the network analysis? [13]

Immediate Predecessor	-	-	-	A	A	B	C	C	D	E,F,G	H
Activity	A	B	C	D	E	F	G	H	I	J	K
Duration (Weeks)	10	12	9	8	5	13	6	4	15	7	9

4. a) What is the difference between evaluation and controlling? Discuss about elements of project control. [5]
- b) For a particular project budgeted cost of work schedule was Rs. 9,50,000 and budgeted value of the work performed was Rs.8,00,000 at a point of reporting date i.e at 20 weeks from starting date. But, the actual cost of work performed was Rs. 10,00,000 and the project completion time is 45 weeks. The project having estimated cost of Rs. 50,00,000. Based on above information, draw features of that project and comment on each parameter of earned value analysis. [7]
5. a) How risk can be identified and analyzed for a rural road project. Explain the procedure. [5]
- b) What are the methods that could be used in risk management after identifying major risk. Justify giving suitable example how risk transfer is taken as risk response planning. [5]
6. Define the term project finance and what are the sources of financing in any project? Write down and explain about the determinants of capital structure decision to be undertaken for investment proposal. [3+5]
7. Write short notes on: (any two) [5×2]
- i) Cost-benefit analysis
  - ii) Resource leveling
  - iii) PMIS
  - iv) Project software

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1. a) Define project. Explain the characteristics of project with appropriate examples. [1+4]  
b) How project goal or objectives are set? Explain goal setting criteria. [5]
2. a) What are the objectives of project appraisal? Explain Financial and Technical Appraisal in detail. [2+4]  
b) Define project proposal. Discuss cost benefit analysis for a road project. [2+4]
3. a) Define planning and scheduling. Prepare a Linked Bar-chart for a construction project with at least 10 activities. [2+4]  
b) Define Critical Activities and Float. Draw a CPM network [AOA or AON] and find EST, EFT, LST, LFT, TF, FF, IntF and IndF. [2+5+6]

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Predecessor	-	-	A	A,B	B	C,D	D	D	E,H	E,H	F,G,I	L
Duration Days	1	3	2	4	3	5	1	2	6	3	2	4

- c) What is WBS? Discuss importance of WBS. [4]
4. a) Define Monitoring and Control. Explain why project controlling is difficult in Nepal. [3+3]  
b) What is EVA? A construction work had to be completed in 10 days with 50 labour days at Rs 1000 per day i.e with total cost of Rs 50,000. At the end of third day, only 25% work was completed with the use of 18 labour days at Rs 800 per day. Perform earned value analysis and comment on the performances. [1+5]

**OR**

- Define quality. Explain how quality can be controlled in construction of urban roads. [6]
5. a) Define Project Risk. How risk can be analysed? Explain with example of hydropower project. [1+4]  
b) How risk can be managed? Explain how you manage three risks in hydropower project you identified above. [5]
  6. Define Capital Budgeting decision. Explain its importance. Calculate Explain ARR of a project with initial cost of Rs. 100000 and salvage value of Rs 20000 after 5 years. Stream of income in year 1 to year 5 are Rs. 15,000; 20,000; 25,000; and 20,000 Tax rate is 25%. Assume suitable method of depreciation. [1+2+2]
  7. Write short notes on: (any two) [4×2]
    - i) Project life cycle
    - ii) Planning software MS project
    - iii) Elements of project control
    - iv) Environmental analysis for project formulation

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- ✓ Assume suitable data if necessary.

1. Define Project. Elaborate Labor intensive, Capital Intensive, Joint Venture and Multilateral projects. Explain various elements of task environment. [2+4+4]
2. a) What is project appraisal? Explain marketing, management and environmental appraisal. [2+6]  
b) Define project proposal. Explain in brief about procedure for developing a project proposal. [2+6]
3. a) Draw the network diagram of the given project having following activities. Obtain project duration, critical path, TF, FF and interfering float. Prepare the resource aggregation chart and allocate the mason using early start schedule. [8+5]

Activity	Duration (days)	Mason (per day)
1-2	3	1
2-3	3	2
2-4	4	4
2-5	2	2
3-10	3	2
4-6	2	3
4-7	4	3
5-9	4	4
6-8	2	2
7-9	4	1
8-9	3	2
9-11	3	4
10-11	2	2
11-12	2	1

- b) Discuss on Work Breakdown Structure. [3]
4. a) Define Monitoring and Evaluation. Explain project control cycle. [2+4]  
b) Why cost control is important? A contractor agreed to build 50 doghouses in 90 days at a price of \$1000 per unit. 20 days later, the contractor has finished 10 doghouses with an actual cost of \$8500. What is the status of the project? [2+4]  
c) What is PERT? Discuss with example. [4]
5. Define Risk. Explain various sources of project risks. Describe important steps of risk management. [2+5+5]
6. a) What is capital structure planning? Discuss with examples. [5]  
b) What is capital budgeting decision? Explain its importance. Discuss Net present value used in capital budgeting decision. [5]

**OR**

What are the sources of financing large projects?

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- ✓ Assume suitable data if necessary.

1. a) Explain Work Breakdown Structure as a tool of project planning and state the importance of project planning.
- b) Draw the CPM network diagram (or Precedence diagram) from the following activity relationships: Compute total minimum project time of completion, critical activities and ES, EF, LS, LF, TF, FF, IntF and IndF.

Activity	A	B	C	D	E	F	G	H	I
Duration	3	5	5	6	2	3	4	2	6
Predecessor	-	A	A	A	B,C	C	D,E,F	D	G,H
Successor	B,C,D	E	E,F	G	G	G	I	I	-

Also mark the critical path in the network diagram.

2. a) Define project and explain its characteristics in brief. What are the major differences between project management and traditional management? Explain about the external environment of the project.
- b) Define project formulation and project appraisal. Write the procedure for developing a project proposal. What are the drawbacks of cost-benefit analysis of project formulation?
3. a) Why project planning is necessary to operate any project in dynamic environment? Linked bar chart is one of planning tool in project scheduling, justify this statement with suitable example. Is there limitations of this chart?
- b) Find out the expected time of each contractor to complete a given project having following details. Also, find out which contractor you prefer for operation and why?

Contractor	$t_o$	$t_i$	$t_p$
A	5	7	13
B	6	11	12
C	3	5	7

4. a) Discuss "monitoring, evaluation and control" is a must to succeed in a project. Explain project management information system and justify "the right information at the right time reduces the risk of wrong decision".
- b) Explain the term 'project finance' and describe features of sound capital structures. Write down and explain with example what are the factors to be considered to take capital structure decision.
5. a) Define risk management planning. Explain in details about internal and external risks in project. Justify giving suitable example how risk reduction is taken as risk response planning.
- b) A project has total capacity of \$1,000,000 which consists of 4,000 shares @ \$100; \$300,000 preference shares @ 18% interest; and remaining loan @15% interest. Earning before income and tax in a year is \$200,000. Compute the Earning per Share (EPS) and Book Value of Share, if Tax Rate is 20%.

Exam.	Regulation		
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1. Differentiate between labour intensive and capital intensive projects with example? Explain project Goal setting <sup>Criteria</sup> with an aid of suitable example. [3+5]
2. Define project formulation and project appraisal. Describe procedure for developing a project proposal. [2+2+8]
3. a) Explain Bar chart with its advantages and limitations. [8]
- b) Define the term planning and explain the features of good project planning? Find all the components of CPM from the following information: [4+12]

S.N	Activity	Duration	Predecessor	Successor
1	A	3	-	D
2	B	6	-	E,G,I
3	C	2	-	F
4	D	2	A	G
5	E	1	B	H
6	F	3	C	I
7	G	7	B, D	-
8	H	3	E	-
9	I	4	B, F	-

4. a) Justify the statement "quality costs more, but lack of quality costs even more" giving examples of total quality cost included to achieve good quality. [6]
- b) A construction company is planned to fix 100 units of precast window in 20 days with a budget of 25 lakhs. The progress status was reviewed on 10 days from date of start of fixing and only 40 units were fixed with the expenses of 9 lakhs. Find out all the parameters of earned value analysis and comment on its performance. [6]
5. Define risk and risk management. Explain about internal risk of any construction project that is facing by a Nepalese construction company. Explain with suitable example risk transfer. [2+8+2]
6. a) Define Capital Structure. XYZ company has total capital of Rs.10,00,000 which consists of 40% share and 60% loan issued @ 12% interest. It requires Rs.20,00,000 more to invest in a project and is considering for following three options. [1+6]
  - i) Rs.8,00,000 share and Rs.12,00,000 loan @14% interest
  - ii) Rs.5,00,000 share; Rs.7,00,000 preference share @15% interest and Rs.8,00,000 loan @14% interest and
  - iii) Rs.10,00,000 share and Rs.10,00,000 preference share @ 15% interest.
 Which is the best option based on Earning Per Share Calculation if the Earning before interest and tax in a year is Rs.5,00,000 and tax applicable is 30%
- b) Define Capital Budgeting decision. Explain ARR or return on Equity. Recommend appropriate measures that Government should take to attract private sector in Hydropower projects. [1+2+2]

Exam.	New Batch (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCE, BEL, B.Agr.	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering (CE701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Define project. Explain any four characteristics of engineering projects. [1+4]  
 b) What is Project Environment? Explain Task Environment in detail. [1+4]
2. a) Elaborate the statement "Technical Appraisal is most important in project". [6]  
 b) Define Technical and Financial proposal. Explain the contents of Technical proposal. [2+4]
3. a) Draw a network diagram and find EST, EFT, LST, LFT, TF, FF independent float and interfering float of building project having following details. What is the significance of critical path in the network diagram. [12+2]

Predecessor	-	-	-	-	B	E	C	A,F	C,E	D,G
Activity	A	B	C	D	E	F	G	H	I	J
Duration (in weeks)	6	10	11	9	5	8	12	8	7	4

- b) What are the steps in project planning process? Write down work breakdown structure (WBS) for a building project and why it is necessary in construction project? [5+5]
4. a) Define project Monitoring and Evaluation. Explain project control cycle. [2+4]  
 b) Define Quality. List various factors affecting quality of projects in Nepal. Differentiate between Quality Assurance and Quality Control. [2+2+2]
5. a) What is Risk? Explain various types of risks in project. [1+5]  
 b) List different types of risks for the implementation of hydropower projects in Nepal and recommend appropriate risk response plan for those risks. [6]
6. Explain capital structure planning and features of sound capital structure. A project cost Rs.50,000 and has a scrap value of Rs.10,000. It stream of income before depreciation and taxes during first year through five years is Rs.10,000; Rs.12,000; Rs.14,000; Rs.16,000 and Rs 20,000. Assume 30% tax rate depreciation on straight line basis. Calculate ARR of the project. [4+6]



Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCE, BEL, B.Agric.	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering (CE701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. Differentiate between Bilateral, Multilateral and Joint Venture project with example? Discuss the external environment in which a project is operated. [4+6]
2. Define concept of project appraisal. Explain about contents of technical and financial proposal. Also explain input analysis of project formulation. [2+7+3]
3. a) Construct the CPM network for a project with following activities: [16]

Activities	A	B	C	D	E	F	G	H	I	J
Predecessor	-	-	A,B	B	A	C	E,F	D,F	G,H	I
Days	4	7	4	3	2	1	6	5	8	9

Find:

- i) Critical path
- ii) Project completion time
- iii) EST, EFT, LST, LFT, Total float, Free float ( $F_F$ ), independent float ( $I_dF$ ) and Interfering float ( $I_f$ )
- b) Define the terms resource histogram, resource levelling limited resource allocation and work break structure. [2+2+2+2]
4. a) Write the concept of Monitoring, Evaluation and Controlling and also explain project control cycle. [3+4]
- b) Why cost control is important in project? 15 houses were to be completed in three months with per unit cost of Rs 25,00,000/-. In one month 4 houses were completed with total expenditure of Rs 96,00,000/- use earn value analysis to find the status of the project. [3+4]
5. Define 'risk'. Explain various sources of project risk. Elaborate risk response planning. [1+5+4]
6. Define the term project financing. Explain features of capital structure planning. A project has total capital of Rs 5,00,000 which consists of 2000 shares @ Rs 100, 1,50,000 preference share 18% interest and remaining loan @ 14% interest. Earning before interest and tax in a year is Rs 1,00,000. Calculate EPS and book value of share if tax rate is 25%. [2+4+4]

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BEL, B.Agri.	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering (CE701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Define a project. Explain the characteristics of project and project life cycle in detail. [2+4+4]
2. Define project appraisal. Write procedure for developing a project proposal. Discuss on techniques of project formulation. [2+4+6]
3. a) Why scheduling is important in planning phase of project? Find all the components of CPM from the following information: [3+13]

S.N	Activity	Duration (days)	Successor
1	A	2	D,E
2	B	5	D,E,H,I
3	C	3	H,I
4	D	4	F,G
5	E	2	G
6	F	4	J
7	G	1	J
8	H	3	J
9	I	2	-
10	J	3	-

- b) Prepare a work breakdown structure and draw simple bar chart of a project which includes at least twelve activities. [3+5]
4. a) What are the factors that cause difficulties in project? [4]
- b) You have a project that is scheduled to be completed in 10 days at a budgeted cost of Rs.1,00,000/- . After the completion of 6 days, you do an analysis and you determined the job is 70% of work is complete and the expenditure is Rs.65,000/- . Based on this data is your work performance is on track? Perform EVA and comment on your own performance. [5]
- c) Define quality. What are the techniques of quality control in a project? [1+4]

**OR**

Explain the relationship between cost, schedule and quality in a project.

5. Why we need analysis of project risk? Explain about sources of risk in a project. What do you mean by qualitative and quantitative risk analysis? [2+4+4]
6. What is capital budgeting decision? Why it is important? A hydropower project costs Rs.30 crore, life is expected to be 40 years and salvage value is Rs.10 crore. Annual income is Rs.6 crore and annual O and M cost is 3% of initial cost. Is it worthwhile to invest if MARR is 10? Use PW and BCR methods to evaluate. [2+2+6]

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TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
Examination Control Division

2068 Baishakh

Exam. Level	Regular / Back		
	BE	Full Marks	80
Programme	BCE, BEL, BEX, BCT, BME	Pass Marks	32
Year / Part	IV / I		3 hrs.

*Subject: - Project Engineering*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Define a project and classify it? Name the characteristics of a project and describe what you mean by temporary team/organization in a project. [8]
- b) Name project life cycle and explain how you set goals in a project by giving example of one goal and verifying the same with the criteria of goal setting. [8]
2. For a project, following durations are given: [16]

SN	Activity	Durations	Precedence	Successor
1	A	5	-	E
2	B	6	-	F
3	C	7	-	G
4	D	8	-	H
5	E	9	A	I, J
6	F	7	B	I, J
7	G	5	C	I, J
8	H	3	D	I, J
9	I	4	E, F, G, H	-
10	J	5	E, F, G, H	-

Find EST, EFT, LST, LFT, TF, FF. Show critical path and find duration.

3. a) Define PERT and discuss its uses. Project A and B have  $t_0$ ,  $t_m$  and  $t_p$  as 5, 8, 12 and 6, 8, 11 respectively. Find Mean and Standard Deviation. Which project is better and more certain? [8]
- b) What are Gantt chart and discuss about resource allocation and smoothing. [8]
4. a) Differentiate Monitoring and Controlling by explaining Project Control Cycle. Explain the concept of Earned Value Analysis used for controlling cost. [8]
- b) Define Work Breakdown Structure? Write its importance and use. [8]
5. a) Explain the importances of Budgeting. Name different types of budgets and explain Capital Budgeting decision and Budgeting process. [8]
- b) Describe Socio Economic survey and also social and ordinary cost benefit analysis. [8]
6. Write short notes on: (any two) [8+8]
  - a) Environmental problems and type of impacts
  - b) Project Management Information System (PMIS)
  - c) Linear Programming
  - d) Goal setting in a project
7. Write short notes on: [4x4]
  - a) WBS and its uses
  - b) Feedback Control System
  - c) Manpower Levelling
  - d) Cashflowability and Capital Structure

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Exam.	Regular / Back		
	Level	BE	Full Marks
Programme	BCE, BEL, BEX, BCT, BME	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Five** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. a) Define 'project'. Elaborate the statement 'A project has definite time limit'. Explain also SMART criteria of goal setting with suitable example. [2+3+3]

b) Describe the use of Gantt Chart. Using Gantt chart; estimate the project completion time for the following project. [8]

Activity	A	B	C	D	E	F
Preceding Activity	None	None	A	A	B	D, E
Duration (days)	8	6	14	5	9	4

2. a) Explain total float and free float. Draw CPM diagram. Find interfering float and independent float for the following activities showed. [2+10]

Activity	A	B	C	D	E	F	G	H	I	J
Duration (weeks)	1	5	2	7	4	3	2	1	4	9
Predecessor	—	—	A	B	B	B, C	D	E	F, G	D, H

b) What is resource histogram? Explain the importance of resource leveling. Give example. [1+3]

3. a) Define the terms 'Activity' and 'Event' used in network analysis. Explain the need of dummy activity in a network with the aid of an example. What are the three time estimates used in PERT? [2+3+3]

b) What are the methods of cost control? Briefly explain the terms BCWS, BCWP, ACWP, SV, CV, CPI and SPI used in earned value analysis. [3+5]

4. a) What are the causes of delays in the project in the context of Nepal? Explain project control cycle. [4+4]

b) Define budget. Explain advantages and disadvantages of budgeting. [8]

5. a) Briefly explain different sources of project finance. A company has total capital of Rs. 800000 which consists of 3000 share @ Rs. 100 each and Rs. 500000 loan borrowed @ 12% interest per year. The company requires Rs. 500000 more to invest in a project and is considering following two alternatives. (i) 40% share and 60% loan at 15% interest per year (ii) 30% share, 20% preference share at 18% interest per year and 50% loan at 15% interest per year. The company expects to earn Rs. 250000 in a year. Which is the best option if tax rate is 25%? [3+5]

b) Illustrate different types of environmental impacts. What do you mean by Social Cost Benefit Analysis? [4+4]

6. Write short notes on: (any four) [16]

- ✓ a) Work Breakdown Structure
- ✓ b) Environmental Impact Assessment
- ✓ c) Linear Programming
- ✓ d) Essential conditions of budgetary control
- ✓ e) Fixed and flexible budget

~~BEX - IV~~

03  
 TRIBHUVAN UNIVERSITY  
 INSTITUTE OF ENGINEERING  
 Examination Control Division

2067 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCE, BEL, BEX, BCT, BME	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

*Subject: - Project Engineering*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Define Project. Discuss briefly on any five important characteristics of projects. 2+6  
 b) Why planning is necessary in project? Describe the steps involved in planning a project. 4+4
2. What is dummy activity?. Draw a CPM network and find TF, FF, Interfering and independent floats for the following activities. 2+4+8

SN	Activity	Duration	Predecessor
1	A	1	-
2	B	5	-
3	C	2	A
4	D	7	B
5	E	2	B
6	F	3	B, C
7	G	4	D
8	H	1	D
9	I	3	E
10	J	4	F, G
11	K	4	D, I
12	L	6	F, G, H, K

3. a) Draw linked Bar chart of a project "Performing Marriage of my Brother" with at least 10 activities. Show milestones also. 6+2  
 b) What is Time scale Network? Define resource leveling and discuss on its importance. 3+2+3
4. a) What is work breakdown Structure (WBS)? What are its uses? Draw a WBS of a project of your interest. 2+3+3  
 b) Define preference share. A firm has equity capital consisting of 4000 ordinary share @ Rs 100 per share and loan of Rs. 8, 00,000 borrowed at an interest rate of 10% per year. The firm wants to raise Rs. 10, 00,000 to finance its investment and is considering two alternative methods of financing i.e. i) to issue 4,000 common shares @ Rs. 100 each and to borrow Rs 6, 00,000 at 12% interest and ii) to issue 2000 common shares @ Rs. 100; to issue 3, 00,000 preference share at an interest rate of 18% and to borrow Rs. 5,00,000 at 12% interest. If the firm's earnings before interest and tax is 3, 50,000 and the tax rate applicable is 30%, determine earning per share to decide on the alternatives. 2+6

5. a) Describe the importance of cost control in a project. A project was estimated to complete in 20 days at the expense of Rs. 5, 00,000. At the end of 5<sup>th</sup> day 25 percent of the work was completed with expenditure of Rs 1, 30,000. Use earned value analysis to comment on the performances. Also estimate the cost as well as duration required for completing the remaining work. 3 + 5

b) Define capital budgeting decision. Why it is important? Find AW and IRR of the project following two projects to select the best. MARR = 12% 2+2+4

Project	Initial Investment	Net annual income	Life (Years)	Salvage value
A	20 million	4 million	20 years	5 million
B	30 million	5 million	25 years	10 million

6. a) Define budget. Describe advantages, problems and dangers of budgeting. 1+2+2+3

b) Elaborate Environmental Impact Assessment (EIA). Describe various types and categories of impacts. 3+3+

7. Write short notes on any four (4 X 4 = 16)

- (a) Setting goals and its importance in a project
- (b) PERT analysis
- (c) Project Control Cycle
- (d) Project Evaluation criteria
- (e) Types of Budget
- (f) Social Cost benefit Analysis (SCBA)

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Level	BE	Full Marks	80
Programme	BCE, BEL, BEX, BCT, BME	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Explain project family tree with suitable example. Explain also criteria of goal setting in any project. [4+4]
- b) List out different phases of project life cycle. Explain in details what are the activities to be done in implementation phase of project life cycle. [8]

2. Define forward and backward pass in the network analysis. Draw the network diagram and compute EST, EFT, LST, LFT, TF, FF, IF and interfering floats for each activities of the project having precedence relationship as shown below. Also find out critical path. [4+12]

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Duration (days)	10	9	7	9	8	5	11	6	9	12	10	8
Predecessors	—	—	A	A	B	B	D, E	C, G	H	G	G, F	K

3. a) Explain with examples closed system and open system of control. Justify the statement "Quality costs more, but lack of quality costs even more". [8]
- b) Define Project Management Information System (PMIS), stating objectives of PMIS. Explain the various choice of information channel in a project. [8]

4. a) Why project planning is necessary in any project? List out the planning tools used in project management. Write down the limitations of conventional bar chart showing suitable example of a bar chart. [4+4]

- b) Explain earned value analysis graphically showing favourable and unfavourable cases of variance. For a particular project, budgeted cost of work schedule was 9,50,000 and budgeted value of the work actually completed or earned value was 8,00,000 at a point of reporting date i.e. at 20 weeks from starting date. The completion time of project is 45 weeks. Based on above details, draw features of that project and comment on the schedule performance. [4+4]

5. a) List out various errors in drawing a network diagram. Find out the expected time of each engineer mentioned below. Which engineer you will choose and why? Who is more certain in completing the job? [4+4]

Types	$t_o$	$t_m$	$t_p$
NTC Engineer	5	9	12
NCell Engineer	4	5	9

- b) Describe environmental impact analysis. Explain in brief about shadow pricing, market externalities, market imperfection and social cost benefit analysis. [8]

6. a) Define budgeting? List out different types of budget. Explain the essential and purpose of budgeting for a new project. [8]

- b) Define capital structure planning. Explain in brief cash flowability, leverage ratio, flexibility and marketability of the company. [8]

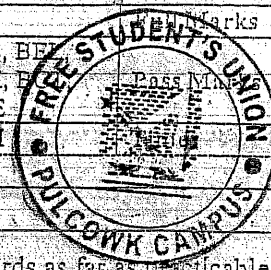
7. Write short notes on: (any four) [4x4]

- a) Environmental problems in Nepal
- b) WBS with example specifying levels
- c) Material scheduling
- d) Linear programming
- e) Resource allocation and smoothing
- f) Budgetary control

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2066 Bhadra

Exam.	Regular / Back	Marks
Level	BE	80
Programme	BCE, BE, BEX, BME	32
Year / Part	IV / I	3 hrs.



Subject: - Project Engineering

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Define project. Explain the different characteristics of project. [8]
- b) Define project life cycle phases. Explain, with example, the typical life cycle phases of a project. [8]
2. A project has the following schedule, construct the network diagram and compute EST, EFT, LST, LFT, TF, FF, IF and interfering floats for each activities and find critical path. [16]

Activities	A	B	C	D	E	F	G	H	I	J	K	L
Predecessors	None	None	A	B	B	C, D	E	E	G, H	H	I, J	E, F
Time	8	2	1	9	4	5	6	3	3	5	2	3

3. a) What do you mean by project planning? Explain the importance of work break down structure for project planning. [6]
- b) Define, monitoring, evaluation and control. Explain briefly quality control, cost control and schedule control in the project. [4+6]
4. a) What are the differences between CPM and PERT? Find the  $t_e$  (time estimates for x and y where  $t_o, t_m, t_p$  is 4, 6, 8 for x and 3, 5, 6 for y. Also find which is more certain by using S.D. and variance. [8]
- b) Define E.I.A. What are the environmental problems in Nepal and how do you improve them? [8]
5. a) Why capital structure planning is important for business firm? Explain in brief the determinants of capital structure planning. [2+6]
- b) Rank by using payback method, present worth, IRR and B/C ratio method. [8]

Item	Initial Investment	Annual Cash Flow	Life in years
1	Rs. 60000	12000	15
2	Rs. 88000	22000	22
3	Rs. 2150	1500	3
4	Rs. 20500	4500	10

6. a) Define Project Management Information System (PMIS). Why PMIS is important for effective coordination of project activities? [8]
- b) Define budget, sales budget, production budget, cash budget, fixed budget and flexible budget. [8]
7. Write short notes on any four: [4x4]
  - a) Resource allocation and smoothing
  - b) Earned value analysis
  - c) Steps in capital budgeting
  - d) SMART criteria
  - e) Socio-economic Analysis (Social Cost Benefit Analysis)



INSTITUTE OF ENGINEERING  
Examination Control Division

2065 Shrawan

Level	BE	Pass Marks	32
Programme		Time	40 hrs.
Year / Part			

Subject: - Project Engineering

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Explain project, characteristics of a project. Explain goal setting (SMART). [8]
- b) Explain monitoring, evaluation and controlling and project life cycle. [8]
2. a) Explain CPM and PERT and their uses. [5]
- b) Draw the network. Find EST, EFT, LST, LFT, TF, EF and IF. [11]

SN	Activity	Duration	Predecessor	Successor
1	A	5	—	B, C, D
2	B	4	A	E
3	C	2	A	F, H
4	D	3	A	G
5	E	2	B	H
6	F	1	C	I
7	G	3	D	I
8	H	1	C, E	—
9	I	2	F, G	—

3. a) Describe the purpose of budget, project budget, operation budget, sales budget, cash budget and advantages of budget. [10]
- b) Explain budgetary control, objectives, advantages and essential conditions for applying a budget. [6]
4. a) Describe the elements of cost control, system of control and feed back control system. [8]
- b) Describe in detail the work-break-down structure. [8]
5. a) Explain capital budgeting, needs and importance steps and capital budgeting process. [8]
- b) Explain EIA. Describe different environmental problems and types of environmental impacts and method of identification and comparison by check list method. [8]
6. a) Draw Bar-chart and explain its advantages and disadvantages. Also find  $t_s$  and variance when  $t_s$ ,  $t_m$  and  $t_p$  are 6, 8, 12. [8]
- b) Explain earned value analysis. When 125 cub.m. of concrete is to be done in 10 days at the cost of Rs. 1,250,000 at the end of the third day managed to complete 40 cub.m. of concrete with expenses of Rs. 3,75,000. Find EVA and comment the performance. [8]

7. Write short notes on any four:

[4×4]

- a) Linear Programming
- b) Socio-economic Survey and SCBA
- c) Capital Structure Planning and Debt Equity Ratio
- d) Resource Allocation and Smoothing

Exam.	Back		
Level	BE	Full Marks	80
Programme	All (Except B.Arch.)	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Project Engineering**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Define project? How does project differ from non-project job? Discuss with suitable example? [2+6]
- b) Why goal setting is important for a project? Discuss briefly on life cycle phases of a project. [8]
2. Using CPM network find EST, EFT, LST, LFT, TF, FF, and IF (independent float) for the following activities. Find critical path and project duration also. [16]

SN	Activity	Duration	Predecessor	Successor
1	A	3	-	B, C, D
2	B	5	A	E, F
3	C	2	A	G
4	D	7	A	H, J
5	E	2	B	I
6	F	1	B	J
7	G	3	C	J
8	H	1	D	K
9	I	1	E	L
10	J	3	D, F, G	L
11	K	5	H	L
12	L	4	I, J, K	-

3. a) How does planning help the implementation of the project? Explain the use of linear programming technique in planning? [4+4]
- b) What is PERT? In what situation PERT analysis is useful? Discuss project scheduling with limited resources. [1+3+4]
4. a) Define and difference monitoring and evaluation. Discuss briefly on various methods of cost control in a project. [3+5]
- b) What is feedback control? Define work breakdown structure. Explain its users. [3+2+3]
5. a) Define capital planning and budgeting. Why investment decision requires special attention? Discuss different phases of capital budgeting. [2+3+3]
- b) What do you mean by preference share? A company which has total capital of Rs. 10,00,000 which includes equity capital consisting of 4000 ordinary shares @ Rs. 100 per share and debt capital of 6,00,000 which cost 12% interest. The firm wants to raise Rs. 5,00,000 to finance its investment and is considering two alternative methods of financing (i) to issue 5000 ordinary shares @ Rs. 100 (ii) to borrow Rs. 5,00,000 at an interest rate of 12%. If the firm's earning before interest and tax is 2,25,000 and the tax rate is 20% which source of fund would you prefer? Give reasons. [2+6]
6. a) What do you mean by master budget? Differentiate between fixed budget and flexible budget. What are the advantages of budgetary control? [2+3+3]
- b) What is social cost benefit analysis (SCBA)? What are the underlying principles (rational) behind SCBA? How does it differ from simple cost benefit analysis? [2+3+3]
7. Write short notes on: [4x4]
  - a) Environment problems in Nepal
  - b) Earned value analysis
  - c) Project management information system
  - d) ARR method of project appraisal