Khulna University of Engineering & Technology
Department of Building Engineering and Construction Management
B. Sc. Engineering 4th Year 1st Term Regular Examination, 2019

BECM 4101

(Project Financing and Construction Marketing)

Full Marks: 210 Time: 3 hrs

N.B. i) Answer any three questions from each section in separate script.
ii) Figures in the right margin indicate full marks.

Section – A

1. (a) What is project finance? Categorize the project which are easiest to finance. (07)
   (b) Develop a typical project financing model for an infrastructure project. (15)
   (c) Briefly elaborate at least two instruments that assist investor to evaluate cash flow of a project. (13)

2. (a) Explain a conventional structure of project finance and corporate finance with figure. (10)
   (b) Write short note on (i) Non-recourse financial structure (ii) SPV (iii)Off take agreement (iv) Sponsors and (v) Lender. (25)

3. (a) Define Public Private Partnership (PPP).Discuss the principles of Public Private Partnership. (10)
   (b) Explain with example the necessity of Viability of Gap Finance (VGF) in a PPP project. (10)
   (c) Briefly describe the key responsibilities of the following PPP stakeholders in the bidding process (i) SPV (ii) Construction company and (iii) Operating company. (15)

4. (a) Distinguish between "Solicited" and "Un solicited" PPP proposal. What are the phases for selection of solicited PPP project in the context of Bangladesh? (12)
   (b) Currency adjustment method can be used to manage foreign exchange risk- Explain the process. (10)
   (c) Identify the risks of a typical PPP project from the host Goverentment perspective with brief description of each risk. (13)

Section – B

5. (a) Define market segmentation. Give an example of a simple marketing system with figure. (10)

   (b) What is construction marketing? Describe the necessity of construction marketing for construction industry. (10)

   (c) Briefly explain the construction marketing environment with a proper figure. (15)

6. (a) What is strategic planning? Elaborate a strategic triangle of construction marketing. (10)

   (b) Elaborate the strategic formulation, implementation and evaluation with example and figure. (15)

   (c) Define MIS. Discuss about the ethical issues in marketing research. (10)

7. (a) What is international construction marketing? Write down the reasons for entering and avoiding international construction markets. (11)

   (b) Your analysis report is either negative or positive, how the decision would be taking to deal with international partners? (15)

   (c) Write short notes on (i) Regional marketing strategies (ii) Global marketing strategies and (iii) Transnational marketing strategies. (09)

8. (a) What is strategic alliance? Describe the rational to choose strategic alliance or joint venture. (10)

   (b) What are the most important benefits of construction strategic alliance? Write down the pros and con of joint venture. (15)

   (c) Define E-marketing. Write down the advantages and drawbacks of E-marketing. (10)

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BECM 4103

(Construction Communication and Procurement Management)

Full Marks: 210 Time: 3 hrs

N.B. i) Answer any three questions from each section in separate script.
ii) Figures in the right margin indicate full marks.

Section – A

1. (a) Define communication and construction communication. Explain the objectives and methods of basic communication. (08)

   (b) Suppose, you are a CEO of a reputed company. As a CEO effective state and describe the seven C's effective communication. (15)

   (c) What is good and effective communication? Broadly interpret the communication process. (12)

2. (a) Define clear communication. How to be a good listener? (08)

   (b) What do you mean by oral and written communication? Depict levels of communication. How to overcome barriers of communications? (15)

   (c) As an engineering student suggested that, where and when visual communication should be used? How the body language affects the communication. (12)

3. (a) What Is oral presentation? How do you plan your oral presentation? (05)

   (b) "The success of oral presentation mostly depends on two points"- Explain. (10)

   (c) How can you prepare and demonstrate your oral presentation? (10)

   (d) Write short notes on: (i) OIBCC basic formula and (ii) PREPY. (10)

4. (a) Suppose you are a managing director of an organization. You will face different types of conflict. Now, explain the effects of conflict in team. How to deal with conflict? (10)

   (b) Define team and team work. Why team building is needy for professional success. (10)

   (c) As chief engineer of a govt. project, you need to handle lots of project. You need effective team members. So, how can you form a team? Who will be the team members? Explain it. (10)

   (d) How you will be a smart professional person using communication knowledge? (05)

Section – B

5. (a) What are the major components of a typical tender documents? Describe how to prepare it? (10)

   (b) What are the conditions for using direct procurement method? (07)

   (c) Briefly describe the tender security and performance security. (06)

   (d) Write short note on: (i) Liquid asset (ii) Annual turnover (iii) Frame work contract and (iv) Performance-based contracts. (12)

6. (a) Define tenderer, supplier, quotation and service. (08)

   (b) What are the basic-characteristics of general contracting in procurement management? Briefly describe. (14)

   (c) Describe the features of a typical Design and Build (D & B) contract. (13)

7. (a) Define construction management contracting. Briefly describe the circumstances where the construction management method of procurement is suitable. (12)

   (b) What are the general characteristics of "Acceptance" after making an offer to build a contract? Briefly describe. (13)

   (c) How construction management risk allocation influences the construction management contracts? Explain. (10)

8. (a) Define front-loading. Describe the problems will arise for excessive front-loading. (08)

   (b) Describe the importance and limitations of cost-benefit analysis for a construction project. (15)

   (c) A project was started about twelve years ago. Initial investment of this project was 100000 TK. The project earned 120000 TK at the year of nine. Total maintenance cost was about 60000 TK at the year of eleven. Now evaluate the project at the year of twelve using any criteria of cost-benefit ratio considering time value of money. Assume interest rate of this project is 15%. (12)

Khulna University of Engineering & Technology

Department of Building Engineering and Construction Management

B. Sc. Engineering 4th Year 1st Term Regular Examination, 2019

BECM 4105

(Health and Safety in Construction)

Full Marks: 210 Time: 3 hrs

N.B. i) Answer any three questions from each section in separate script.

ii) Figures in the right margin indicate full marks.

Section – A

1. (a) What is fire triangle? Write down the stages of fire growth and how it can be suppressed? (09)

   (b) Point out the major excavation hazards in the workplace. (07)

   (c) How fire safety engineering and structural engineering can work together to minimize fire hazard in a building? Provide your opinion. (06)

   (d) State the new concept in work zone safety. Describe the effective traffic control system in the road way work zones. (13)

2. (a) Describe the common electrical hazards those are associated with construction workplace. (12)

   (b) What types of protective systems can employers use to protect workers from cave-ins? (09)

   (c) What are the key elements of a safe system of work for a confined space? (06)

   (d) What preventive measures should be taken in fire prevention and fire protection methods? (08)

3. (a) Distinguish between scaffolding and scaffolder. What are the requirements for safe scaffold erection and use? (09)

   (b) What are the limitations make the crane hazard in the construction workplace? (04)

   (c) Differentiate between 'PFP' and 'AFP' systems. In what situation 'PFP' system is suitable for the structures? Discuss briefly 'PFP' system for a building. (12)

   (d) How risk assessment method of fire safety relate with human behavior? Concisely describe the risk assessment method of fire safety in workplace. (10)

4. (a) Describe the following fall protection terms with respect to its specific purpose and application in the construction site (i) Fall restraint (ii) Fall arrest (iii) Fall positioning and (iv) Fall suspension. (12)

   (b) What types of protective system can be used to protect workers from cave-ins? Explain briefly. (08)

   (c) Write down the roles of erection engineer during the erection stage of structural steel work. (07)

   (d) If you want to demolish a RC structure in Bangladesh, which method of demolition would you prefer? Briefly describe the demolition sequence of a structure in your preferred method. (08)

Section – B

5. (a) Define the term grounding. Explain shortly the methods of grounding. (06)

   (b) Define job safety analysis. Develop a JSA report for construction of a typical slab. (09)

   (c) How will you prioritize hazardous tasks of construction for analysis? (05)

   (d) Suppose you are project safety manager of ABC company, Your company wants to build a 100 story high-rise building in the middle of a busy city like Dhaka. Now explain, how will you control your site for ensuring health and safety of your project participants and outsiders? (10)

6. (a) Define PPE. Write down the requirement of PPE in the construction workplace. (07)

   (b) Write down the tasks in construction area related with eye and face injury. What factors should be considered for hand and arm protection? (08)

   (c) When respiratory protection is required for construction workers? Describe the different types of equipment for respiratory protection. (08)

   (d) Write down the key planning tools in structural steel erection. How do you manage risk at the steel erection stage? (12)

7. (a) Why safe work permit is required? Describe different types of safe work permit in construction workplace. (10)

   (b) Describe different types of human errors and violations in construction site. (10)

   (c) Define subcontract. Write down the approach to manage the sub-contractors in case of construction works. (09)

   (d) Write down the planning about health and safety in a pre-construction phase. (06)

8. (a) What actions should be taken for emergency response procedure? (10)

   (b) What are the basic accident causing factors? Why accident investigation and reporting is important for any construction site? (10)

   (c) What is worker compensation insurance? Write down the workers compensation rate according to Bangladesh Labor Act (BLA). (06)

   (d) Describe the multi-employer work site issues in construction workplace. (09)

Khulna University of Engineering & Technology
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B. Sc. Engineering 4th Year 1st Term Regular Examination, 2019
BECM 4109
(Green Building and Environmental Technology)

Full Marks: 210 Time: 3 hrs.

N.B. i) Answer any three questions from each section in separate script.
ii) Figures in the right margin indicate full marks.

Section – A

1. (a) Define green building. State the principles and objects of green building. (10)
   (b) Define sick building syndrome. Name some green building projects in Bangladesh. State the requirements of green building. (13)
   (c) Define pozzolanic reaction. Discuss the health and pollution issues of concrete and metals in a construction project. (12)

2. (a) Enlist the BD+C project checklist of LEED v.4 for "Location and Transportation" and "Materials and Resources" with points. (20)
   (b) Define: Potable water, irrigation efficiency and dual flush toilets. Discuss the significance of indoor water efficiency. (15)

3. (a) Discuss the tools used in energy efficiency. Write short note on: On-site renewable energy, green power and carbon effects. (12)
   (b) State the factors that contribute IAQ. Detail the strategies for ventilation control. (13)
   (c) Discuss the significances of acoustic control. State the checklist for acoustic control. (10)

4. (a) Discuss HVAC, plumbing and plug loads for building O+M category. (12)
   (b) Explain the bonus categories for IP. Draw the flow chart for the acceptance of a project according to LEED. (15)
   (c) Explain the value of sustainable cost v/s benefit by pie diagram. (08)

Section – B

5. (a) What do you mean by environmental technology? Discuss the relationship between environmental technology and sustainability. (07)
   (b) What are the impurities present in water? Write down their effects in a nut shell. (09)
   (c) Show that the efficiency of a settling tank is dependent on surface area, not depth of tank. (09)
   (d) Calculate the dimension of a rectangular settling tank to treat 100 m^3 of water per hour when the overflow rate is 0.5 m/hr and the detention time is 4 hours. (10)

6. (a) Describe the characteristics of slow and rapid sand filtration. (08)
   (b) Write short notes on: (i) Coagulation, (ii) Flocculation, (iii) Roughing filtration, (iv) Pond sand filter, and (v) Chlorination (Any four) (12)
   (c) Design a septic tank to serve a household of ten persons who produce 160 lpcd of wastewater. The tank is to be desludged every six years. (15)

7. (a) Define solid waste and solid waste management. Explain the following terms: (i) Reuse, (ii) Recycle, and (iii) Resource recovery (Any two) (10)
   (b) What is composting? Write down the benefits of composting. (15)
   Define: (i) Self-cleaning velocity, (ii) Non-scouring velocity, and (iii) Hauled and (iv) Stationary container system.
   (c) Describe the important aspects that should be considered for the design and operation of sanitary landfill. (10)

8. (a) Define 'Environmental Impact Assessment (EIA)'. Describe briefly the elements of EIA. (08)
   (b) Write short notes on: (i) Environmental Conservation Act (ECA), (ii) Baseline environmental studies, (iii) Components of environmental monitoring plan, and (iv) Environmental auditing (Any three) (12)
   (c) What is EMP? Describe the components of EMP. What is the structure of an EIA report? (15)

Khulna University of Engineering & Technology
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B. Sc. Engineering 4th Year 1st Term Regular Examination, 2019

CE 4123

(Foundation Engineering)

Full Marks: 210 Time: 3 hrs

N.B. i) Answer any three questions from each section in separate script.
ii) Assume reasonable values for any missing data.

Section – A

1. (a) Define the ultimate bearing capacity and allowable bearing capacity of soil. State the criteria that foundation design must be satisfied. (06)

   (b) Explain three different modes of soil shear failure with neat sketches. (09)

   (c) A square footing is 1.8 x 1.8 m with a 0.4 x 0.4 m square column. It is loaded with an axial load of 1800 KN and M_x = 450 KN.m, M_y = 360 KN.m. The footing depth is 1.8 m. The foundation soil properties are Ø = 36°, γ_{sat} = 18.0 KN/m^3. The water table is at the ground surface. What is the allowable bearing capacity if SF = 3.0 according to Meyerhof's bearing capacity equation? (20)

2. (a) What is sub-soil exploration? Write down the purposes of sub-soil investigation. (10)

   (b) What is N-value? Discuss the standard penetration test (SPT) procedure in details for determining the soil strength in field. At which situations SPT should be halted? (13)

   (c) What is cofferdam? Discuss the uses, requirements, selection criteria and construction of cofferdam. (12)

3. (a) What is meant by ground improvement technique? Why should one choose ground improvement option in solving geotechnical engineering problems despite the availability of conventional foundation system? (10)

   (b) What does it mean by vertical drains? Discuss different types of vertical drains. What are the advantages of using vertical drains? (13)

   (c) State the working principles of vacuum preloading and electro-osmosis. Give some advantages and disadvantages of those methods. (12)

4. (a) Distinguish between pneumatic and open caissons. Discuss the stability issues during floating of box caisson. (11)

   (b) What is sand island? Explain the construction and advantages of sand island. (12)

   (c) Write short notes on: (i) Soil nailing (ii) Reinforced earth (iii) Geo synthetics (12)

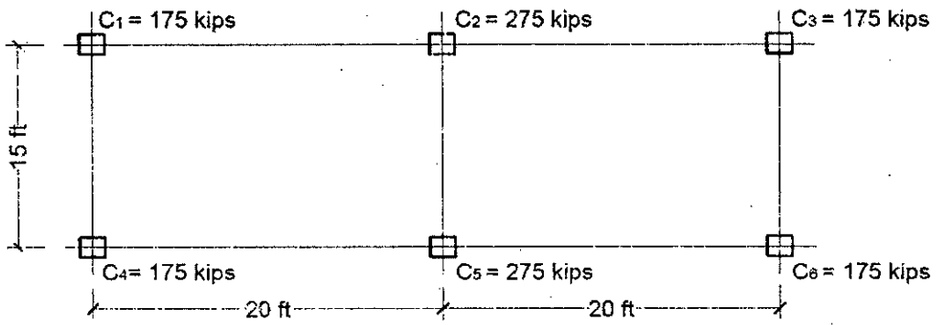
Section – B

5. (a) What are the causes of failure of foundations? (05)

   (b) Shortly describe when the combined footing is recommended. (05)

   (c) Design a rectangular footing of uniform thickness for an axially loaded column of 20 inch x 15 inch in size transmitting a load of 300 Kips. The safe bearing capacity of soil is 2.25 Ksf. Use f'_c = 3000 psi and f_s = 24000 psi. Show the reinforcement details. (25)

6. (a) A structure is supported on six columns arranged as shown in the figure given below. All columns are 20 inch x 20 inch in size. The central columns carry a load 275 kips each. The load on each of the end columns is 175 kips. Design the suitable raft foundation (slab-beam type). The allowable bearing capacity of the soil is 2.0 ksf. Use f'_c = 3000 psi and f_s = 24000 psi. Show the reinforcement details. (35)



7. (a) What are the basic rules for the design of pre-cast R.C piles? (08)

   (b) Design a pre-cast pile among three piles under a column. Total super imposed load on the column is 900 kips. The piles are to be driven to a hard strata which is available at a depth of 40 ft, and the size of pile 18 inch x 18 inch. Use f'_c = 4000 psi and f_s = 24000 psi. Show the reinforcement details. (22)

   (c) Distinguish between pre-cast pile and cast-in-situ pile. (05)

8. (a) What is machine foundation? Discuss the different types of machine foundation with neat sketches. (10)

   (b) Design a combined footing for two columns C_1 and C_2 having a centre to centre distance of 18 ft. Column C_1 is 16 inch x 16 inch in size and carries a load of 185 kips. Column C_2 is 18 inch x 18 inch in size and carries a load of 215 kips. The safe bearing capacity of soil is 1.15 ksf. Use f'_c = 3500 psi and f_s = 24000 psi. Show the reinforcement details. (25)
