

Khulna University of Engineering & Technology
Department of Building Engineering and Construction Management
B. Sc. Engineering 4th Year 1st Term, Regular Examination, 2018
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) Explain with examples the difference between project finance and corporate finance. (10)
- (b) A Bangladesh-led consortium of investor is preparing a proposal to be submitted to the Government of a neighboring country to design, build, finance and operate a new water supply plant project. What should be the key considerations with regard to the viability of the project? What are the key risk factors that could cause uncertainty in the project's cash flows during the construction and operation period? (15)
- (c) What is the Debt Service Cover Ratio (DSCR) in financial model? Evaluate the significance of DSCR for an infrastructure project developer with example of a developing country. (10)
2. (a) Discuss the principles of Public-Private-Partnership (PPP). (07)
- (b) Write down the challenges of implementing PPP. (08)
- (c) Discuss the sustainable development. What are the main roles of Public-Private-Partnership (PPP) scheme for sustainable development in the developing countries? (10)
- (d) Describe briefly the main characteristics and responsibilities of PPP project manager. (10)
3. (a) Describe the present status of PPP in Bangladesh. (08)
- (b) State briefly the Public-private-Partnership (PPP) scheme and list down the objectives of PPP from the perspective of Government and Private sectors. (12)
- (c) What are investors/ lenders looking from PPP project? (07)
- (d) Explain how the degree of risks associated with PPP project varies with respect to the phases of project? (08)
4. (a) Describe contractual arrangement associated with BOT project. (08)
- (b) Identify the risks of a typical PPP/ BOT project from the host Government perspective with brief description of each risk. (12)
- (c) Define the risk of foreign exchange. Explain the most perfect techniques to mitigate the risk of foreign exchange that interconnected with PPP scheme. (15)

Section – B

5. (a) Define and elaborate on the concept of Marketing and Construction (property) Marketing. (10)
 - (b) Discuss the Construction (property) environments. How the environment elements influence the target customers to buy the property? Explain with figure. (15)
 - (c) Discuss SWOT analysis. Write down the procedure of SWOT analysis in construction marketing. (10)
 6. (a) Define briefly the strategic management and construction management technique. (10)
 - (b) Define strategic alliance. Write down the benefits of international construction alliance. (10)
 - (c) Elaborate the strategic formulation, implementation and evaluation with example and figure. (15)
 7. (a) Your analysis report is either negative or positive, how the decision would be taking to deal with international partners? (15)
 - (b) Describe the rational to choose strategic alliance or joint venture. (10)
 - (c) Discuss about the internal and external factors that affect the construction price decisions. (10)
 8. (a) What is the planning of project management? Explain with figure and example. (08)
 - (b) How do you customize your project management style based on PESTLE analysis? (15)
 - (c) Evaluate the impact of your customized management in property marketing activities? (12)
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Khulna University of Engineering & Technology
Department of Building Engineering and Construction Management
B. Sc. Engineering 4th Year 1st Term Regular Examination, 2018
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) What is communication and construction communication? Explain the objectives and methods of effective communication. (10)
- (b) What is effective communication? Describe the seven C's of effective communication? (17)
- (c) Define oral presentation. What are the purposes of oral presentation? (08)

2. (a) Write short note on: (i) OIBCC basic formula and (ii) PREPY. (10)
- (b) What do you mean by conflict? Classify conflict. Briefly describe the conflict process by flow chart. (10)
- (c) What are the effects of conflict in a team? How to deal with the conflict? (10)
- (d) How to be a good listener? (05)

3. (a) Define clear communication. "Clear communication depends on three C's"- Explain. (10)
- (b) What is visual communication? Where do we use visual communication? What are the criteria you need to follow for writing a document? (17)
- (c) Who is the responsible for communication? Illustrate the merits and demerits of communication. (08)

4. (a) Define levels of communication. Depict levels of communication. How to overcome barriers of communication? (10)
- (b) What is team and teamwork? Why team building is necessary for professional success? (10)
- (c) How can you form a team and explain who will be the appropriate team members? (10)
- (d) How can you prepare your presentation visual for your thesis's defence? (05)

Section – B

5. (a) Describe the methods of identification and selection of an appropriate procurement method for a typical building project. (14)
- (b) What are the required conditions for using Open Tendering Method? (06)
- (c) Write short note on: (i) Frame work contract (ii) Tender security (iii) Performance security (iv) Liquid Asset and (v) Annual turnover. (15)
6. (a) Define General Contracting. (03)
- (b) What are the major components of a typical tender document? Describe how to prepare it? (08)
- (c) Describe the features of a typical Design and Build (D&B) contract. (12)
- (d) Explain the risks associated with a typical Design and Build (D&B) procurement method. (12)
7. (a) Concisely describe the principles of Management Contracting. (10)
- (b) Illustrate the factors that need to be considered for using of Management Contracting? (16)
- (c) Write short note on: (i) Performance based contracts (ii) Joint ventures and (iii) Negotiations. (09)
8. (a) Define project planning. Mention the elements of project planning. (06)
- (b) Define project and project evaluation. What are the purposes of project evaluation? (08)
- (c) Describe the objectives of cost benefits analysis for a construction project. (15)
- (d) If the cost of a project is Tk. 1000000, life time of this project is 2 years, expected rate of return is Tk. 900000 per year and market interest rate is 10% then evaluate the viability of the project using Net Present Value (NPV) method. (06)
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Khulna University of Engineering & Technology
 Department of Building Engineering and Construction Management
 B. Sc. Engineering 4th Year 1st Term Regular Examination, 2018
BECM 4105
 (Health and Safety in Construction)

Full Marks: 210

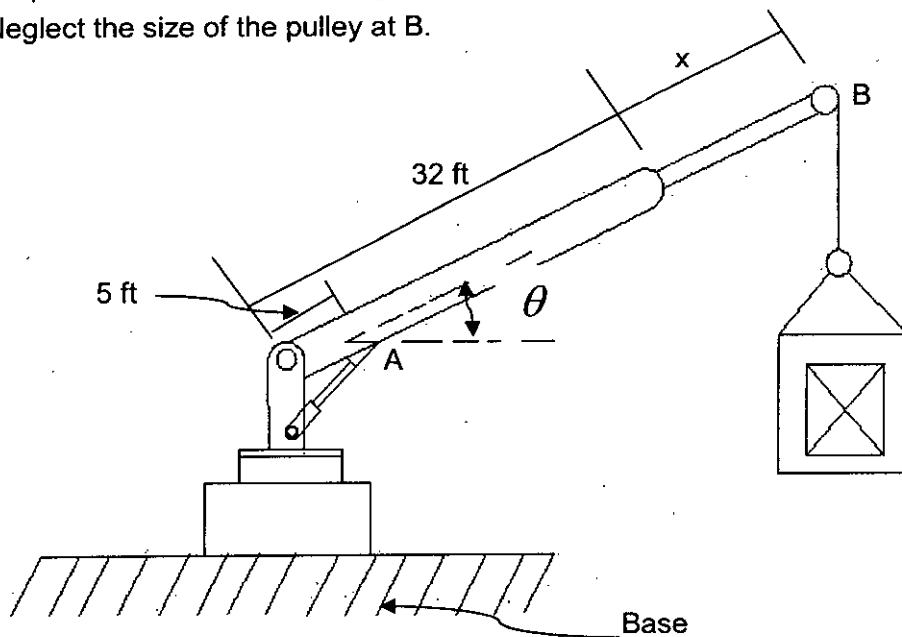
Time: 3 hrs

- N.B.** i) Answer any three questions from each section in separate scripts.
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Section – A

1. (a) Define the term near miss, dangerous occurrence and hazard. What are the benefits of conducting a safety program? (10)
- (b) Point out the major excavation hazards in the workplace. (07)
- (c) What are the key elements of successful health and safety management system? (06)
- (d) Describe briefly the specific excavation requirements for the work place. (12)

2. (a) Define boom length, critical lift and safe lifting in crane safely. What are the planning's should be considered before start-up a crane operation. (10)
- (b) In the construction workplace, the crane can be adjusted for any angle $0^\circ \leq \theta \leq 90^\circ$ with the extension $0 \leq x \leq 17$ ft as shown in figure. For a suspended ^{at A} ~~at A~~ *mass of 350 lb, determine the moment developed at A* for the safe operation of crane which is the function x and θ . Neglect the size of the pulley at B. (07)



- (c) Describe the common electrical hazards and how it can control in the construction workplace. (11)
- (d) What are the responsibilities of an erection engineer before start the work? (07)

3. (a) What is fire triangle? Write down the fire growth stages and how it can suppress. (08)
- (b) What types of protective system can employs use to protect workers from cave-ins? Explain briefly. (08)
- (c) What is asbestos material? Describe the pre-stages that usually consider before demolition of a structure? (10)

- (d) State the function of 'road ranger' for work zone safety? What are the key elements of a safe system of work for a confined space? (09)
4. (a) How can correlate fire safety engineering and structural engineering to minimize the hazard of fire in a building? Give your opinion. (05)
- (b) Write down the components of 'PFP' and 'AFP' systems. State the basic principle of sprinkler system design for fire protection. (10)
- (c) Describe the fall restraint and fall arrest system of fall protection. (08)
- (d) Describe the different methods of fire extinguishing for industrial fire fighting design. (12)

Section – B

5. (a) Define personal protective equipment (PPE). Write down the benefits of PPE using in high rise building construction. (07)
- (b) State the common types of eye and face protection devices. Write down the elements that should be considered for selecting the most suitable eye and face protection. (08)
- (c) Write down the characteristics of personal fall arresting systems using as fall protection in building construction. Also draw the figure by showing considering factors of required fall clearance. (10)
- (d) Write short notes on (i) Hand protection, (ii) Respiratory protection and (iii) Foot protection in case of building construction. (10)
6. (a) Write down the benefits of accident investigation and reporting. Describe the different types of accident investigation. (11)
- (b) Draw accident investigation flowchart. (12)
- (c) Define work compensation. Write down the objectives of work injury compensation. (06)
- (d) Why use a safe work permit in building construction work? (06)
7. (a) Write down the general procedure of safe work permit. (09)
- (b) Define job safety analysis. Write down the parts of job safety analysis. (08)
- (c) Write short note on work injury compensation. Write down the workers compensation rate according to Bangladesh Labor Law. (09)
- (d) A workman was employed in a building construction project on a monthly wage of Taka 20,000. While working helmet with an accident and permanent total disabled on March, 2011. His date of birth is April 21, 1971. Calculate the amount of compensation payable to his dependent. Consider the relevant factor of age 40 is 184.17. (09)
8. (a) Briefly describe the steps of emergency response procedure. (10)
- (b) Describe the multi-employer work site issues in high rise building construction. (08)
- (c) Define subcontract. Write down the approach to managing the subcontractors in case of building construction works. (08)
- (d) Describe the best practices for subcontractors in management in construction. (09)

Khulna University of Engineering & Technology
Department of Building Engineering and Construction Management
B. Sc. Engineering 4th Year 1st Term Regular Examination, 2018
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. What are the characteristics of green building? (10)
(b) What are the LEED impact categories which are expected to make a positive impact for building construction? (07)
(c) Propose the credit categories including prerequisites, credit and points for constructing a Platinum rated building. Use LEED V4 BD & C rating system. (18)
2. (a) Define building envelope. Why building envelope design is necessary? (07)
(b) Write down the basic functions of building enclosures. (10)
(c) Describe the control mechanism of heat, air and moisture of a building enclosure. (18)
3. (a) Define air pollution. Write down the criteria air pollutants with Bangladesh standard value. (05)
(b) How much air, PM₁₀, SO₂ and NO_x you breathe each day? Consider standard value of air pollutants. (08)
(c) How smoking can be controlled at KUET campus? (07)
(d) Define air quality index (AQI). Calculate the AQI and mention the status of air quality using following data: (15)

Air pollutants	Unit	Concentration
PM ₁₀	µg/m ³	225
PM _{2.5}	µg/m ³	185
SO ₂	µg/m ³	95
NO _x	µg/m ³	110
CO	mg/m ³	4.8

4. (a) Write short notes on (any five): (35)
 - i) Surrounding density and diverse use
 - ii) Renewable energy sources
 - iii) Rain water management
 - iv) Light pollution reduction
 - v) Indoor water efficiency
 - vi) Optimization of building energy performance
 - vii) Life cycle impact reduction of buildings
 - viii) Day light and quality views

Section – B

5. (a) Define potable water? Write down the methods of water purification indicating their specific application. (10)
- (b) Explain the process of coagulation and flocculation. How does coagulation differ from plain sedimentation? (08)
- (c) Explain the process of disinfection by chlorination. (07)
- (d) Find the dimension of a setting tank to treat 50 m^3 of raw water per hour when the overflow rate is 0.5 m/hr and the detention time is 2.5 hours. (10)
6. (a) Define wastewater. State the important contaminants in wastewater, their sources and environmental significance. (10)
- (b) What is bacteria? Discuss the biomass growth and food utilization process. (10)
- (c) Design a septic tank for a student hall of 600 persons using following data: (15)
Rate of wastewater = 125 lpcd ; sludge accumulation rate = $0.06 \text{ m}^3/\text{person/yr}$; cleaning interval = 2 yr; Detention period for sedimentation = 24 hrs.
7. (a) Define solid waste. What are the physical, chemical and biological characteristics of solid waste? (12)
- (b) Define the functional elements of solid waste management. How does solid waste management incorporate the functional elements? (08)
- (c) What is composting? Write down the benefits of composting. (08)
- (d) Draw a typical sectional view of a sanitary landfill. (07)
8. (a) Define EIA. Discuss the background of EIA. (05)
- (b) What is the vague definition of Baseline Environment studies? Give an example of baseline studies in EIA. (10)
- (c) What are the different categories of environmental impact characteristics? – Discuss with suitable examples. (10)
- (d) What is EMP? What are the components of EMP? – Discuss. (10)
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Khulna University of Engineering & Technology
Department of Building Engineering and Construction Management
B. Sc. Engineering 4th Year 1st Term Regular Examination, 2018
CE 4123
(Foundation Engineering)

Full Marks: 210

Time: 3 hrs

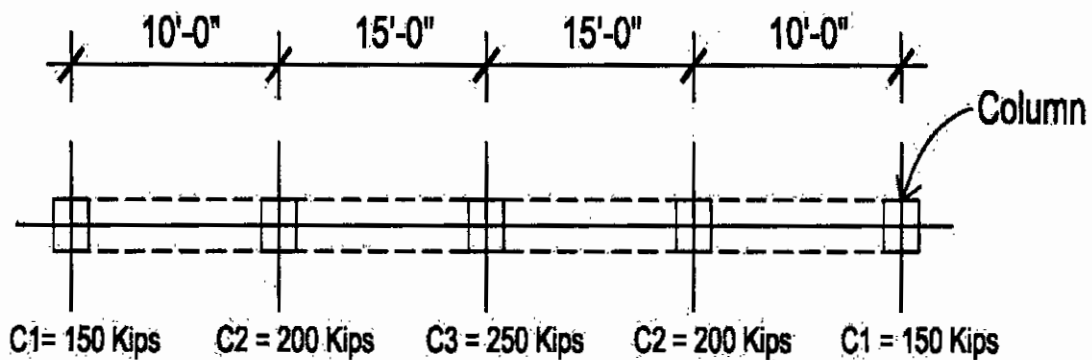
- N.B.** i) Answer any three questions from each section in separate script.
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Section – A

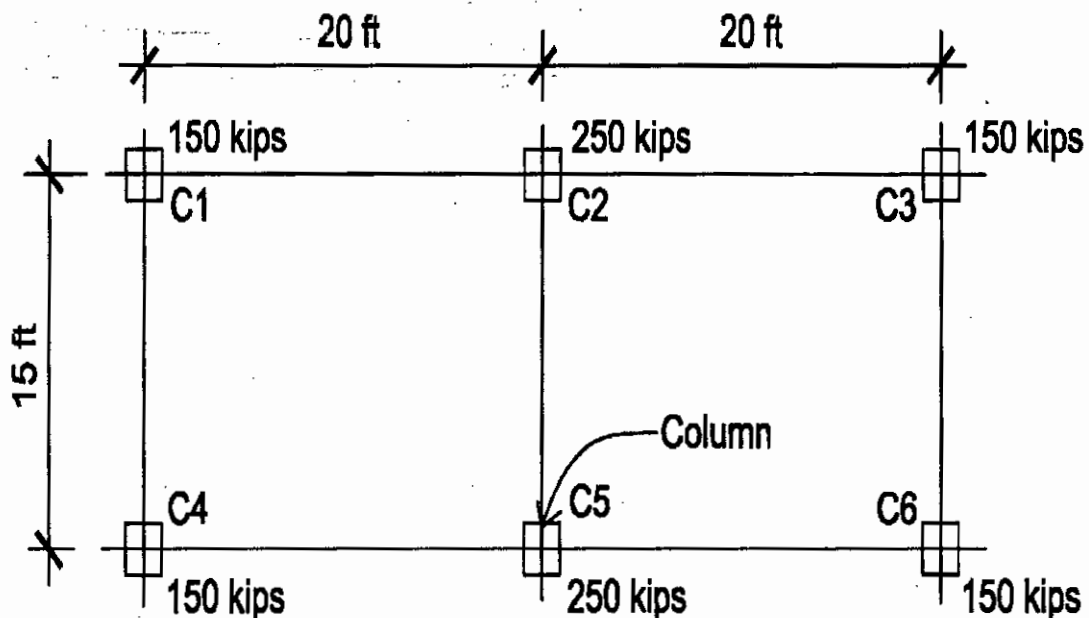
1. (a) Derive the expressions for the bearing capacity of a strip footing resting on ground surface in purely cohesive soil using lower bound and upper bound theorem. (16)
- (b) Describe a field test to directly determine the bearing capacity of soil. (08)
- (c) A series of unconfined compression tests in the zone of interest from a boring logs give average $q_u = 500$ kpa, $D = 1.2$ m, $\gamma = 17.30$ kN/m³, $\phi = 20^\circ$, $C = 20$ kpa. Estimate the allowable bearing capacity for square footing located at somewhat uncertain depths using Terzaghi's equation. Use $F. S. = 3.0$. (11)
2. (a) What is N-value? How N-value is determined in the field? Discuss briefly. (12)
- (b) Differentiate between disturb and undisturbed soil samples. Discuss the suitable sampling methods to collect the undisturbed samples. (10)
- (c) Discuss the suitability, specifications, advantages and disadvantages of different types of boring methods. (13)
3. (a) Define 'soft soil'. Draw the fundamental flow chart of soil improvement technique for shallow foundation. (13)
- (b) Discuss different types of geosynthetics with neat sketches. What are the major functions of geosynthetics. (10)
- (c) Write down short notes on: (i) Vertical sand drain (ii) Root pile (iii) Vibroflotation method (12)
4. (a) Distinguish between caisson and cofferdam. Discuss about the essential parts of a pneumatic caisson. (13)
- (b) Write short notes on: (i) Stability of box caisson (ii) Tilting of caisson (10)
- (c) What is 'sand island'? Discuss the construction and advantages of sand island. (12)

Section - B

5. (a) Design an isolated column footing of uniform thickness for an axially loaded column (20) of 20 inch x 15 inch in size transmitting a load of 250 kips. The safe bearing capacity of soil is 2.0 ksf. Use $f'_c = 3000$ psi and $f_y = 60000$ psi. Show the reinforcement details.
- (b) Design a pile cap for a column 18 inch square exerting a load of 250 kips. Each (15) pile has the bearing capacity of 75 kips and 18 inch in diameter. Use $f_y = 60000$ psi and $f'_c = 3000$ psi. Show the reinforcement details.
6. Design a continuous footing with foundation grade beam as shown in figure below. (35) All columns have size of 18 inch x 18 inch, and allowable bearing capacity of soil is 1.25 tsf. Use $f'_c = 3000$ psi and $f_y = 60000$ psi. Show the reinforcement details.



7. A structure is supported on six columns arranged as shown in figure below. All (35) columns are 15 inch x 15 inch in size. The load on each column is shown in the figure. Design a raft foundation (slab-beam type). The allowable bearing capacity of soil is 1.0 tsf. Use $f'_c = 3000$ psi and $f_y = 60000$ psi. Show the reinforcement details.



8. (a) Perform the structural design of a pre-cast pile under a column to carry the (25) superimposed load of 200 kips. The pile is to be driven to hard a strata which is available at a depth of 30 ft. Use $f'_c = 3000$ psi and $f_y = 60000$ psi. Show the reinforcement details.
- (b) Define machine foundations. What are the general requirements of machine (10) foundations?