



AIKTC/KRRC/SoET/ACKN/QUES/2018-19/

Date: _____

School: SoET

Branch: ME-CEM (CBDS) SEM: II

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following [✓]Semester/[✓]Unit Test-I/[✓]Unit Test-II (Reg./ATKT) question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Advanced Construction Technology	CEM-201		✓	02
2	Infrastructure Development	CEM-202		✓	02
3	Project Economics & Financial Management	CEM-203		✓	02
4	Institute Level Optional Course-II (Research Methodology)	CEM-201X		✓	02
5	Department Level Optional Course-II (Energy Conservation Technique in Building Construction)	CEM-202X		✓	02
6					

Note: SC - Softcopy, HC - Hardcopy

(Shabeen Ansari)
Librarian, AIKTC

3 Hours

80 Marks

Answer any four questions.

- Q.1** (20)
- a Describe the applications of tunnel formwork system. 05
 - b Explain the working of Maglev trains. Give some examples of maglev trains throughout the world. 05
 - c Draw a labelled diagram showing various components of a thermal power plant stating the function of each component. 05
 - d Write down the stepwise procedure of diaphragm wall construction. 05
- Q.2** (20)
- a Write a detailed note on Tunnel shaft sinking. 10
 - b State the purpose of constructing: i) Caissons. ii) Cofferdams. 10
- Q.3** (20)
- a Discuss chemical based waterproofing which is preferred these days over the conventional methods. 08
 - b Discuss the equipments/techniques used for construction and maintenance of high rise structures. 08
 - c Compare conventional formwork & slipform. 04
- Q.4** (20)
- a Describe Incremental launching method of bridge construction. 10
 - b Write a detailed note explaining the steps to be taken and facilities to be installed while constructing an underground metro system. 10
- Q.5** (20)
- a Write a note on port trusts in Mumbai region alongwith the recent developments taking place in the premises. 10
 - b Explain the working of an atomic power plant with special reference to any particular atomic power plant. 10
- Q.6** (20)
- a Write short notes on : i) Underwater blasting. ii) Well point system. 10
 - b Write a detailed note on Vertical shaft sinking machine. 10
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18

(3 Hours)

[Total Marks: 80]

- N.B 1) Answer any four out of six questions.
2) Each Main Question carries equal marks.
3) Draw sketches, wherever required.

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- Q.1) Write short notes on followings (any four) --- 20
a) Mumbai Metro rail Project
b) Environment & Infrastructure
c) Bandra-Worli Sea link
d) Golden Quadrilateral
e) P.P.P Models
- Q.2a) Define, Infrastructure. Explain detailed classification of Infrastructure Projects. ---10
b) Explain the sources of finance required for implementation of Infrastructure Projects. ---10
- Q.3a) Explain how government policies affect Infrastructure development? --- 10
b) Explain determinants of economic development of nation. --- 10
- Q.4a) Explain by mentioning facts how government policies affects Infrastructure development? --- 10
b) In context of 12th five year plan, explain vision, policy challenges & main provisions for developing various sectors of infrastructures --- 10
- Q.5a) What do you understand by, "Special Purpose Vehicle? Explain with examples. --- 10
b) What you understood by F.D.I? Explain the role of F.D.I in construction industry. --- 10
- Q.6a) What is FICCI? Explain its role clearly. ---10
b) Explain:- i) Time Over run & Cost Over run ii) G.D.P ---10
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18

15/5/

Time: 3 Hours

Marks: 80

- Note: 1. Attempt any 4 Questions
2. Assume suitable data, if required
3. Figures to the right indicate marks
4. Attempt sub questions in order

1. a) A contractor has to take a decision whether to bid for a construction project or not. The decision criteria is based on NPV. The project worth is ₹ 2000 crores to be completed in 5 years. Based on the tender conditions and the company policy, following information is generated: [14]

- Mobilization Advance: 9% of project worth. Mobilization Advance will be deducted in 3 equal instalments, starting from the 2nd year
- C.E Advance: 10% of project worth. It will be deducted in 2 equal installments starting from the 3rd year
- Material cost component of the project is 45%. Secured advance against materials brought to site is 60% of the material cost. Secured Advance is accounted in proportion to the yearly bill payable to the contractor. Secured Advance will be deducted in 3 equal installments from the running bills starting from the 2nd year
- Contractor has to pay 3% as Performance Security in the beginning and 2% Retention amount, which are deductible from each running bill. Performance Security will be released after the end of the project during the 6th year and retention amount will be released in the 7th year at the end of defects liability period.
- the yearly bills payable to the contractor including the retention amount are as follows:

Year	Amount (in crore ₹)
1	300
2	500
3	500
4	400
5	300

- Net profit from the above project before deduction of taxes is 15%. Profit is accounted yearly in proportion to the bill amount
 - Income tax is charged at 25%. Working capital required to be raised is estimated at 10%. Working capital may be divided in the proportion of yearly bill. Interest on the working capital is 12% (simple interest). Repayment of working capital is to be considered in the 6th and 7th year together with its simple interest
 - Consider the cost of capital as 12%
 - Estimated cost of the defects arising during d.l.p is 1% of the project worth
- Prepare a cash flow statement for the contractor over the 7 year period.

Represent the total yearly inflows and outflows w.r.t time graphically and identify whether additional funds may become necessary. Based on NPV, suggest whether the investment in the above project is feasible or not.

b) Explain Mergers and acquisition with examples [06]

2. Answer the following (any 4): [20]

- Eserow Account
- Role of lender's Engineer for execution of a major construction project
- Cash and Credit Management
- Production budget
- Profit and loss account statement

3. a) Summarized below are the income and expenditure forecast for the months of June to Nov 2019. [10]

Month (all credit)	Sales (all credit)	Purchase	Wages	Manufacturing expenses	Office expenses	Selling expenses
	₹	₹	₹	₹	₹	₹
June	6,00,000	4,90,000	95,000	40,000	20,000	40,000
July	6,20,000	3,70,000	95,000	40,000	25,000	45,000
Aug	6,40,000	3,60,000	45,000	45,000	25,000	50,000
Sept	5,90,000	3,60,000	85,000	45,000	20,000	45,000
Oct	5,70,000	3,80,000	95,000	50,000	25,000	40,000
Nov	6,00,000	3,50,000	85,000	40,000	20,000	55,000

You are given the following further information:

- Plant costing Rs. 5,60,000 is due for delivery, in Sept, payable at 10% on delivery and the balance after 3 months.
- Advance tax of ₹ 65,000 is payable in July and October each.
- Period of credit allowed by suppliers is 2 months and to customers is 1 month.
- Lag in payment of manufacturing expenses is $\frac{1}{2}$ month.
- Lag in payment of all other expenses is 1 month.

You are required to prepare a cash budget for 3 months starting on 1st July 2019, when there was a cash balance of ₹ 3,50,000

- b) Explain with an example, the technicalities involved in dealing with foreign exchange on a project having stakeholders from different nationalities. [10]
4. a) A typical cost sheet of a manufacturing company provides following particulars: [10]

Sr. no.	Particulars	Amount per units(₹)
1	Element of costing:	
	a. Raw materials	80
	b. Direct labours	30
	c. Overheads	50
2	Profits:	40

The following additional details are available:

- Raw material in stock – on an average 1 month
 - Material in production – on an average $\frac{1}{2}$ month
 - Finished goods in stock – on an average 1 month
 - Credits allowed by suppliers – 3 months
 - Credits allowed to purchasers – 2 months
 - Lagged payment of wages – on an average $\frac{1}{2}$ month
 - Overhead expenses(Lagged payment) – 1 month
 - $\frac{1}{4}$ th of goods are sold against cash
 - Cash in hand and bank accounts is desired to be maintained at ₹ 4,50,000/-
- Estimate the working capital needed to be kept ready for production of 1 lakh units per annum (assuming production is carried out throughout the year)

- b) Koonkan railway was a major breakthrough for Indian infrastructure projects. Explain [10]

5. Write Short notes on [20]
- Equity and Debt
 - ARR with an example
 - Principles of accounting
 - Wealth maximization vs profit maximization

6. a) Explain How BOT is effective model for financing in bridge projects in India. [06]

- b) The estimated cost of an expressway to be constructed on BOT basis between 2 megacities is ₹ 1800 crores. The project is to be completed in 4 years and the expected life of the project after vehicles start plying on it is 25 years; after which it needs to be scrapped off and replaced. The commissioning period for the contractor is 10 years, after which the project becomes government property. The contractor had taken a bridging loan of ₹ 500 crores (to compounded at 12% p.a) at the start of the project which is to be repayed back between the years 6-10 of the project life cycle in equal yearly instalments. The cashflows at the end of each years are estimated as follows: [14]

Year No.	Construction costs	Expected Toll to be collected	Expected Repairs and maintenance	Year No.	Expected Toll to be collected	Expected Repairs and maintenance
	In crore ₹	In crore ₹	In crore ₹		In crore ₹	In crore ₹
0				15	1050	300
1	400			16	960	330
2	450			17	970	360
3	500			18	980	390
4	450			19	990	420
5		800	115	20	1300	450
6		820	130	21	1015	490
7		840	145	22	1030	530
8		860	160	23	1045	570
9		880	175	24	1060	610
10		900	390	25	1375	650
11		910	210	26	1090	700
12		920	230	27	1000	750
13		930	250	28	900	800
14		940	270	29	750	700

Determine, based on NPV, whether the project is feasible for both the project parties. Also show the BEP of the project.

(Three Hours)

Total Marks: 80

Instructions:

- Attempt any four questions out of six questions
- Assume suitable data wherever necessary
- Figures to the right indicate full marks.

- Q.1 Answer any Four. 20
- Role of SPSS in data analysis
 - Foot notes and Bibliography
 - Importance of t-tests
 - Descriptive statistics
 - Testing of hypothesis
 - Non-parametric tests
- Q.2 a. What is the research methodology? Explain the steps in scientific research process. Briefly explain about literature review. 10
- b. State the sources of research problem. How a problem is identified? Enumerate the criteria for the selection of a problem. 10
- Q.3 a. Explain the concept of attitude scale. Explain the Likert's scale to measure data attitude. 10
- b. Explain Quantitative vs. Qualitative type of research. Explain Post Facto research and Motivation in research. 10
- Q.4 a. Explain critically interpretation and Organization of the data. 10
- b. Hypothesis is a statement which involves a relationship of variable. Enumerate the types of variables included in stating a hypothesis. 10
- Q.5 a. What are the characteristics of research? What are the factors affecting research design? 10
- b. "A systematic bias results from errors in the sampling procedures". What do you mean by such a systematic bias? Describe the important causes responsible for such a bias. 10
- Q.6 a. What are the differences between observation and interviewing as methods of data collection? Explain with two specific examples of situations where either observation or interviewing would be more appropriate. 10
- b. You have been asked to research setting up of a roadside hotel. Design a questionnaire to find out the prospects of proceeding with the venture. 10



3 Hours

Total marks :80

Answer any four questions.

Neat, labeled sketches, legible handwriting & practical examples will be appreciated.

Q.1		(20)
a	Describe the need for the Energy Conservation.	08
b	State the function of an energy audit. What are the data collected and presented.	06
c	Briefly explain about 'Green House Effect.	06
Q.2		(20)
a	Describe how an investigation into the thermal comfort provided in a building can be measured	08
b	Explain the Legal Requirement for Conservation of fuel and power in building.	06
c	Enumerate design principles for 'Energy Efficient Buildings' of various zones with examples.	06
Q.3		(20)
a	Explain Building Energy Rating Systems. Illustrate LEED & IGBC system.	08
b	Discuss in detail, the principles of ventilation in buildings with a simple case study.	06
c	Explain Principles & Objectives of Energy management in detail.	06
Q.4		(20)
a	Illustrate Green Building Design with an example.	08
b	Enumerate the general principles of passive solar heating along with key elements.	06
c	Explain the Post Energy Audit Activities in detail.	06
Q.5		(20)
a	Energy Saving opportunities HVAC system in detail.	08
b	Discuss Sustainable water & waste management system for building with an example.	06
c	Give any two examples of mechanical devices to control heat in buildings.	06
Q.6	Write short notes on	(20)
a	Heat Island effect	05
b	Carbon Credit	05
c	Improvement of Power factor	05
d	Water recycling and energy conservation	05