ME -sem -II - CBGS - Civil (CCA & M)

11/5/16

QP Code : 14975

(CBGS)

(3 Hours) **Total Marks: 80**

N.B 1) Answer any four questions.

2) Each main Question carries equal marks.

Q1 a) What do you understand by" Dispute Resolution Board'? Explain it in detail. --- 10 M.

b) Explain. 1) Contingent Contract 2) Implied Contract

3) Executed Contract 4) Contract on record --- 10 M.

Q.2 a) Explain main features of "Sale of goods Act 1930?

Also explain the rules for delivery of goods according to this act. --- 10 M.

b) Explain arbitration process in detail. --- 10M.

Q.3 a) Explain main features of "'Indian Contract Act- 1872" --- 10 M.

b) What is bailment? Also explain the role of bailee & bailor. --- 10 M.

Q.4 a) Explain," Workmen's Compensation Act-1923" in detail. --- 10 M.

b) Explain: - 1) Minimum Wages Act-1948 2) Payment of Wages Act- 1936 --- 10 M.

Q.5 a) Explain, "Trade Union Act- 1926" --- 10M.

b) Explain standard clauses of contract mentioned by MOS & PI.? --- 10 M.

Q.6) Explain the followings: --- 20 M.

1) Pledge 2) Indemnity 3) Trade unions in India 4) Global Tenders

5) Special documents required for B.O.T. Contract.

BB-Con. 9474-16.

18 ME.CIVIL/Sem-II CBSGS/OR 13-5-16

QP Code : 14978

CBGS

3 Hours Total marks :80

Answer any four questions.
Assume suitable data, state your assumption clearly.

Q.1 (20)

a Write a detail note on "Operations Research" with the help of following points: 05
i) Definition
ii) Scope of Operation Research (OR)
iii) Applications of various OR techniques
iv) Types of OR models

b What are the advantages and limitations of Linear Programming Problems? 05

c The manufacturer of patent medicines is proposed to prepare a production plan for medicines A & B. There is sufficient ingredient available to make 20,000 bottles of medicine A & 40,000 bottles of medicine B, but there are only 45,000 bottles into which either of the medicines can be filled. Further it takes three hours to prepare enough material to fill 1000 bottles of medicine A and one hour to prepare enough material to fill 1000 bottles of medicine B, and there are 66 hours available for this operation. The profit is Rs 8 per bottle for medicine A and Rs 7 per bottle for medicine B 10
i) Formulate this problem as a LPP
ii) Find the solution by graphical method.

Q.2 (20)

a Solve the following LPP by simplex method..... 10

$$\text{Max } Z = 4x_1 + 5x_2 + 9x_3 + 11x_4$$
$$\text{subject to } x_1 + x_2 + x_3 + x_4 \leq 15$$
$$7x_1 + 5x_2 + 3x_3 + 2x_4 \leq 120$$
$$3x_1 + 5x_2 + 10x_3 + 15x_4 \leq 100$$
$$x_1, x_2, x_3, x_4 \geq 0$$

Q 2 b Hindustan construction company needs 3,3,4,&5 million cubic feet of fill at four earthen dam sites in Punjab. It can transfer the fill from three mounds A, B, & C were 2,6 & 7 million cubic feet of fill is available respectively. Costs of transporting one million cubic feet of fill from mounds to the four sites in lakhs are given in the table. 10

	I	II	III	IV	
A	15	19	17	18	2
B	16	13	12	13	6
C	12	17	20	11	7
	3	3	4	5	

Solve the problem using transportation algorithm for minimum cost.

Q.3 (20)

a What is Simulation? Why Simulation is used for solving real life problems? 10

b What is a Model? Discuss various classification schemes of models. 10

Q.4 (20)

a Find minimum of "f = x(x—1.5)" in the interval of (0,1) to within 10% of the exact value. 07

b Write the introduction and procedure of Golden section method. 06

c Maximize $Z = 60x - x^2$ in the interval (0,100) with an accuracy of 0.1%by using Fibonacci method, using n = 4. 1101. 07

[TURN OVER

Q.5 (20)

a Determine x_1, x_2, x_3 so as to 10

$$\text{Maximize} \quad Z = -x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2$$

$$\text{Subject to constraints} \quad x_1 + x_2 \leq 2$$

$$2x_1 + 3x_2 \leq 12$$

$$x_1, x_2 \geq 0$$

b Vehicles arrive at service station in a Poisson fashion at an average rate of 45 minutes. The average time taken for service is 30 min. with exponential distribution. Determine: 10

i) The chance that a vehicle will be serviced straight away.
ii) The proportion of time the service station is busy.
iii) The average no. of vehicles I the queue and the system.
iv) The average time spent by vehicle waiting in the queue and the system.
v) The probability that there are two vehicles in the queue.

Q.6 (20)

a State the principal of optimality and apply it to solve the following problem... 10

A member of a certain political party is making plans for his election to the parliament. He has received the service of six volunteer workers and wishes to assign them to three districts in such a way as to maximize their effectiveness. He feels that it would be inefficient to assign a worker to more than one district but he is willing to any one of the district if they can accomplish in other districts. The following table gives the estimated increase in the number of votes in his favor in each district if it were allocated various numbers of workers.

No of workers	Districts		
	1	2	3
0	0	0	0
1	25	20	33
2	42	38	43
3	55	54	47
4	63	65	50
5	69	73	52
6	74	80	53

How many of the six workers should be assigned to each of the three districts in order to maximize total estimated increase in the number of votes in his favor?

Q.6 b Find the sequence that minimizes the total elapsed time required to complete the following tasks on two machines. 10

Task	A	B	C	D	E	F	G	H	I
Machine I	2	5	4	9	6	8	7	5	4
Machine II	6	8	7	4	3	9	3	8	11

ME - Comp. Engg & Mgmt - Sem-II - CBGS
(Civil)
(PE & FM)

17/5/16

QP Code : 14981

CBSGS **80 Marks** **3 Hours**

Note: 1. Attempt any 4 Questions **2. All questions carry equal (20) marks**
3. Figures to the right indicate marks **4. Attempt sub questions in order**
5. Assume any data, if required, and state them clearly

1. a) A contracting firm, in a particular financial year, has the following accounting sub-heads involved:

i. Cash in hand: ₹ 43,936 /-
ii. TDS payable: ₹ 49,634 /-
iii. Provisions to be made in sinking fund deposit: ₹ 88,192 /-
iv. Amount to be invested in various bank accounts: ₹ 51,335 /-
v. Various debtors: ₹ 35,46,826 /-
vi. Various loans and advances: ₹ 94,11,816 /-
vii. Various creditors of different resources: ₹ 27,84,258 /-
viii. Security deposits to be paid to various clients: ₹ 19,52,634 /-
ix. Value of tax already deducted at source: ₹ 11,47,572 /-
x. Repayment of secured loan: ₹ 49,40670 /-
xi. Fixed deposits with banks: ₹ 29,30,221 /-
xii. Fixed assets: ₹ 40,15,876 /-
xiii. Investment done in various types of shares: ₹ 23,76,540 /-
xiv. Shareholder's capital in capital account: ₹ 72,26,553 /-
xv. Value of work in progress(closing stock) ₹ 61,51,000 /-
xvi. Payment received from balance of previous works: ₹ 96,937 /-
xvii. Payment received from client: ₹ 9,69,423 /-
xviii. Repayment of unsecured loans: ₹ 20,78,622 /-
xix. Share holder's funds w.r.t their current account: ₹ 92,00,000 /-
xx. Sundries payable as per list: ₹ 23,40,919/-

Separate out the budgeting heads into assets and liabilities and hence prepare a balance sheet for the above particulars for the financial year. Workout the various financial ratios and hence comment on the financial stability of the firm based on the values obtained. **[04+08]**

1. b) Financial survey and subsequent analysis done in a particular area reveals that investment in residential projects has an expected risk of 12% and an expected return of 16%, whereas investment in infrastructure projects has an expected risk and return of 20%. Which portfolio would you invest in and why? Justify. Make suitable assumptions as regards to risk-return characteristics of the 2 investment patterns, when:

i. the economy is at its peak
ii. during recession **[08]**

2. Write short notes (any 4)
a) Sources of finance
b) CIDC-ICRA grading system of construction entities
c) Role of lender's Engineer for execution of a major construction project
d) Role of a finance manager in construction
e) Mergers and acquisition with examples **[20]**

3. a) Innumerate the various ways in which the funds were raised from conception to completion of the Konkan Railway project. Discuss the hurdles faced and the solutions determined thereof. In your opinion, is the case study an example of financial success or a financial failure? Justify. **[12]**

3. b) Your company is considering an investment of ₹ 5 lakhs capital outlay over a period of 5 years. The annual income before depreciation is as follows.

Year	Income (₹)
1	2,10,000
2	2,00,000
3	1,80,000
4	1,25,000
5	90,000

After 5 years, the scrap value expected is ₹ 50,000/- . Depreciation is to be considered at 20% per year on a straight line basis for first 3 years and the rest for 2 years. Income Tax chargable for the firm is 25% on the total profit. Determine

i. Pay back period.
ii. Average Rate of Return on initial investment
iii. Average Rate of Return on average investment. **[08]**

4. 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 ₹ 100 crores to be completed in 4 years. Based on the tender conditions and the company policy, following information is generated:

i. Mobilization Advance: 10% of project worth. Mobilization Advance will be deducted in 3 equal instalments of 4%, 3% and 3% respectively, starting from the first year
ii. C.E Advance: 2.5% of project worth. It will be deducted in 2 equal instalments starting from the 2nd year
iii. 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 instalments from the running bills starting from the 2nd year
iv. Contractor has to pay 3% as Performance Security in the beginning and 3% Retention amount, which is deductable from each running bill. Performance Security will be released after the end of the project during the fifth year and retention amount will be released in the 6th year at the end of defects liability period.
v. the yearly bills payable to the contractor including the retention amount are as follows:

Year	Amount (in crore ₹)
1	16
2	26
3	38
4	20

vi. Net profit from the above project before deduction of taxes is 6%. Profit is accounted yearly in proportion to the bill amount
vii. income tax is charge at 25% working capital required to be raised is estimated at 15%. Working capital may be divided in the proportion of yearly bill. Interest on the working capital is 12%. Repayment of working capital is to be considered in the 5th and 6th year together with its simple interest
viii. Consider the cost of capital as 15%
ix. Estimated cost of the defects arising during d.l.p is 1.5% of the project worth

Prepare a cash flow statement for the contractor over the 6 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.

Also comment whether the project is feasible if

(i) Cost of capital increases to 20% (ii) Cost of capital decreases to 10%

[14]

4 b) Explain working capital management with an example from the manufacturing sector. [06]

5. a) The following data is generated from the income and expenditure statements of a contracting firm on a particular project which includes foreign collaboration:

		Due Date
i.	Total Project cost: ₹ 500 crores/-	
ii.	1st R.A bill: ₹ 50 crores/-	Jan 2015
iii.	2nd R.A bill: ₹ 75 crores/-	July 2015
iv.	3rd R.A bill: ₹ 75 crores/-	Jan 2016

Every Running Account bill will be paid in INR

v. Cost of materials: 50%
vi. Cost of labour: 20%
vii. Cost of equipment/machinery/plants: 20%
viii. Indirect costs: 5%
ix. Net profit: 5%

Fluctuating exchange rate is to be considered for billing considerations:

x. Material payment 80% in foreign currency(30% USD, 20% Euro, 18% Yen, 12% Saudi Riyal) & 20% in INR
xi. Labour payment 20% in foreign currency(15% Bangladeshi Takka , 5% Sri Lankan Rupee) & 80% in INR
xii. Equipment payment 65% in foreign currency(15% Chinese Yuan, 30% Yen, 10% British Pound and 10% USD) & 35% in INR

When the bid was awarded in July 2014, and in the subsequent half-yearly periods, the exchange rates were as follows:

Currency	Unit	Exchange rate(Equivalent INR)			
		July 2014	January 2015	July 2015	January 2016
USD	1	60	64	65	68
Euro	1	89	82	82	79
Yen	1	0.58	0.52	0.51	0.57
Saudi Riyal	1	16.6	17.6	17.8	18.1
British Pound	1	99	101	101	99
Sri Lankan Rupee	1	0.4	0.38	0.42	0.37
Chinese Yuan	1	8	8.5	7.5	7.2
Bangladeshi Takka	1	0.85	0.85	0.82	0.8

Based on the above tender conditions, workout the impact of the above exchange rate fluctuations on the total project direct cost and net profit considering one year from January 2015 to January 2016. Consider 12% compound interest and ignore effect of exchange rate fluctuations on indirect costs.

[12]

5. b) Summarized below are the income and expenditure forecast for the months of July to December 2016.

Month (all credit)	Sales (all credit)	Purchase	Wages	Manufacturing expenses	Office expenses	Selling expenses
	₹	₹	₹	₹	₹	₹
July	5,00,000	2,60,000	90,000	40,000	20,000	40,000
August	5,20,000	2,80,000	80,000	30,000	15,000	50,000
September	5,40,000	2,30,000	10,000	45,000	25,000	45,000
October	4,90,000	2,50,000	85,000	35,000	20,000	35,000
November	4,70,000	2,90,000	95,000	40,000	10,000	45,000
December	5,00,000	2,40,000	80,000	30,000	15,000	45,000

You are given the following further information:

i. Plant costing Rs. 1,60,000 is due for delivery, in November, payable at 10% on delivery and the balance after 3 months.
ii. Advance tax of ₹ 80,000 is payable in July and October each.
iii. Period of credit allowed by suppliers is 2 months and to customers is 1 month.
iv. Lag in payment of manufacturing expenses is ½ month.
v. Lag in payment of all other expenses is 1 month.

You are required to prepare a cash budget for 3 months staring on 1st September 2016, when there was a cash balance of ₹ 60,000 **[08]**

6. a) The expected cash flows from 2 alternatives are as follows :-

Year No.	Project A in lakh ₹	Project B in lakh ₹
0	(400)	(560)
1	(120)	120
2	(60)	140
3	(25)	150
4	500	160
5	460	140
6	200	100
7	25	40

For each alternative, determine

i. Pay - back period.
ii. B/C ratio at 12% interest rate.
iii. IRR for Project 'A' (Approximate value)

Which investment alternative you would prefer and why? Justify. **[08]**

6. b) The estimated cost of an expressway to be constructed on BOT basis between 2 megacities is ₹ 2097 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 (on simple interest of 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:

Year No.	Construction costs	Expected Toll to be collected	Expected Repairs and maintenance	Year No.	Construction costs	Expected Toll to be collected	Expected Repairs and maintenance
	In crore ₹	In crore ₹	In crore ₹		In crore ₹	In crore ₹	In crore ₹
0				15		950	300
1	532			16		960	330
2	684			17		970	360
3	629			18		980	390
4	252			19		990	420
5		800	115	20	200	1000	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	190	25		1075	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. [12]

ME-Civil-sem-I-CBGS-ACT 16/5/16

Advanced Constr tech.

QP Code : 14076

CBGS

3 Hours [Total marks :80

Answer any four questions.

Neat labeled sketches and legible handwriting will be appreciated.

Q.1			(20)
	a	Enlist the special concretes and explain any one.	04
	b	Tunneling in soft rocks is difficult. Justify.	04
	c	Enlist the precautions to be taken in mass concreting.	04
	d	Enlist the advantages of Pumped concrete.	04
	e	Explain the effect of groundwater movement on the stability of any structure.	04
Q.2			(20)
	a	Explain the stepwise procedure of underwater tunnel construction.	10
	b	Write a detailed note on Diaphragm wall construction.	10
Q.3			(20)
	a	Explain different grouting methods alongwith their suitability.	08
	b	Write a note on Well point system as a method of dewatering.	06
	c	Enlist the equipments/techniques required alongwith their functions in the construction of a: i) Cablestayed bridge on a waterbody. ii) Multistoried RCC building.	06
Q.4			(20)
	a	Explain the incremental launching method of bridge construction highlighting the shuttering involved.	10
	b	What are the different methods of pile driving? Describe the working of a diesel hammer with a neat sketch.	10
Q.5			(20)
	a	What are the different types of cofferdams? Explain the procedure for installation of cofferdams when a huge dam is to be constructed.	10
	b	What will happen if :	10
		i. Filtering mat is not provided on the surface of fresh concrete in vaccum concreting.	
		ii. Relief holes are not provided while blasting for tunnels.	
		iii. During underwater concreting, bottom of tremie pipe is kept suspended.	
		iv. Bentonite slurry is not used in diaphragm wall construction.	
		v. Piles are left suspended without piercing into hard rock strata.	
Q.6		Write short notes on :	(20)
	a	Bedding of conduits	05
	b	Slip form technique.	05
	c	Micro piling.	05
	d	Caisson and its types.	05

III ME- Civil- CBGS - ID

sem - II

Infrastructu Developt.

20/5/16

QP Code : 14988

(3 Hours) **[Total Marks : 80**

Note: (1) Attempt any four questions out of six questions

(2) Support your explanations with statistical data wherever necessary

(3) Draw neat and clean sketches to explain concepts

(4) Each sub question carry 10 marks

Q1. (a)Explain the effect of Infrastructure in rural economy

(b)Discuss the role of construction industry in generating employment.

Q2. (a) What are the environmental issues related to Infrastructure development in India

(b)Explain the various measures adopted to minimise the environmental impact due to development.

Q3. (a) Explain the main financing mechanisms in Infrastructure projects

(b)Explain PPP mode of Infrastructure development

Q4. (a) Explain the growth, challenges and issues in Railway projects

(b) Discuss the role of PMC and its importance

Q5. (a) Briefly explain the various agencies and sectors associated with infrastructure development in India

(b) Discuss the pre requisites to ensure success for switching over from public sector management to private sector management

Q6. (a) Explain B.O.T, B.O.O.T and B.O.L.T

(a) Explain the need of growth in Power sector and communication sector.

t. IV
ME - Civil - CBGS - sem - II — ECTBC
(const. Engg & Mgmt)
24/5/16
Energy Conservation tech. in Build Constr

QP Code : 14996

CBGS
3 Hours **Total marks :80**
Answer any four questions.
Neat, labeled sketches, legible handwriting & practical examples will be appreciated.

Q.1			**(20)**
	a	Define Energy Conservation & Explain the importance of Energy conservations in building construction.	10
	b	What is an Energy Audit? Explain step by step procedure of Preliminary Energy Audit.	10
Q.2			**(20)**
	a	What is Domestic Energy Consumption? A large open plan office has 180 fluorescent tubes of 54 watt each. Calculate the annual energy consumption.	10
	b	Explain Legal requirements for conservation of Fuel & Power in residential building & Commercial building	10
Q.3			**(20)**
	a	Define Active Solar Energy. Explain Passive solar Design in detail	10
	b	Explain Principles & Objectives of Energy management in detail.	10
Q.4			**(20)**
	a	Explain Improvement of Boiler Efficiency in detail.	10
	b	What is green building? Give the design of Green Building in detail with an example.	10
Q.5			**(20)**
	a	Explain in detail Waste Heat recovery.	10
	b	Explain Embodied energy and Operating Energy in Detail.	10
Q.6		Write short notes on	**(20)**
	a	HVAC System	05
	b	Improvement of power factor	05
	c	Energy savings opportunities in Lighting system	05
	d	Evaluation Tools for Building Energy	05
