Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
ODD SEMESTER EXAM
June 2018

Q. P. Code:
Max. Marks: 100 Duration: 3 hr
Class: B.TECH Semester: VII Program: Civil Engineering
Name of the Course: Adv. Computational Technologies Course Code : BTC407

Instructions:
Paper setter is requested to give necessary instructions.

- Attempt any five questions.
- Assume suitable data if required.
- Answers to all sub-questions should be grouped together.
- Distribution tables are allowed.

Question No		Maximum Marks	Course Outcome Number	Module No.
Q1	A) a) Suppose that height X in inches, of 25 year old man is a normal random variable with mean =70 inches. If P (X > 79) = 0.025, what is std. deviation of the normal random variable? b) Suppose that Weight X in pounds, of 40 year old man is normal random variable with std. deviation =20 pounds. If 5 % of this population weighs less than 160 pounds, what is mean of this distribution? c) Find an interval that covers the middle 95 % of X ~ N (64, 8)	10	01/02	01
	B) A bag of cookies is underweight if it weighs less than 500 grams. The filling process dispenses cookies with weight that follows the normal distribution with mean= 510 grams & std. deviation = 4 grams, a) What is probability that a randomly selected bag is underweight? b) If you randomly select 5 bags, what is the probability that exactly two of them will be underweight?	05	01/02	01
	C) If X ~ *po* (λ) and P(X=0) = 0.323 find the value of	05	01/02	01

	λ to two decimal places & use this to calculate P(X=3)? **B)** If X ~ *po* (λ) and P(X=4)=3P (X=3), find λ & P(X=5)			
Q2	A) Solve following problem by using Chi-square test. A University conducted a survey of its recent graduates to collect demographic and health information for future planning purposes as well as to assess students' satisfaction with their undergraduate experiences. The survey revealed that a substantial proportion of students were not engaging in regular exercise, many felt their nutrition was poor and a substantial number were smoking. In response to a question on regular exercise, 60% of all graduates reported getting no regular exercise, 25% reported exercising sporadically and 15% reported exercising regularly as undergraduates. The next year the University launched a health promotion campaign on campus in an attempt to increase health behaviors among undergraduates. The program included modules on exercise, nutrition and smoking cessation. To evaluate the impact of the program, the University again surveyed graduates and asked the same questions. The survey was completed by 470 graduates and the following data were collected on the exercise question:	08	01/02	02

	No Regular Exercise	**Sporadic Exercise**	**Regular Exercise**	**Total**
Number of Students	255	125	90	470

Based on the data, is there evidence of a shift in the distribution of responses to the exercise question following the implementation of the health promotion campaign on campus? Run the test at a 5% level of significance.

	B) a) What do you understand by Hypothesis testing & its types, error? b) The hourly French fried potato output by the Krisp-o-Matic fry machine is advertised to be 150 pounds. For the new machine purchased by the	12	01/02	02

	Burger Heaven drive-in, tests were run for 22 different one-hour periods, producing an average production of 143 pounds, with a standard deviation of 17 pounds. At the 5% level of significance, does the Burger Heaven management have grounds for complaints?			
Q3	A) Define: Sampling. Explain probability & Non probability samples. Briefly explain the different types of probability sampling & Non probability sampling.	10	01/02	02
	(B) At the head office five reliance energy, five registration counters are available with five workers. How should the counters to be assigned to workers so office gets maximum profit.	10	03	06

Counter	Worker				
	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

Solve by Hungarian method.

Q4	(A) i) Define: Correlation & Regression analysis. **ii)** Explain types of Correlation & formulae for Correlation coef.	08	01/02	04
	(B) A horse was subjected to test of how many minutes it takes to reach a first point to final point. He was made to carry luggage of various weights on 10 trials. Find regression equation between box weights & time taken to final point. Estimate the time taken for the loads of 32 kg, 25 kg & 9 kg.	06	01/02	04

Trial No.	Weight (Kg)	Time taken
1	12	14
2	24	22
3	17	15
4	13	17
5	24	19
6	19	40
7	18	25
8	16	34
9	21	24
10	23	15

Q 5	A) Solve the following LPP using graphical	10	01/02	06

	method. Min $Z= 2X_1 + 3X_2$ Sub to $X_1 + X_2 > 6$ $7X1 + X2 > 14$ $X1 \& X2 > 0$			
	B) A company is trying to decide whether to bid for a certain contract or not. They estimate that merely preparing the bid will cost £10,000. If their company bid then they estimate that there is a 50% chance that their bid will be put on the "short-list", otherwise their bid will be rejected. Once "short-listed" the company will have to supply further detailed information (entailing costs estimated at £5,000). After this stage their bid will either be accepted or rejected. The company estimate that the labour and material costs associated with the contract are £127,000. They are considering three possible bid prices, namely £155,000, £170,000 and £190,000. They estimate that the probability of these bids being accepted (once they have been short-listed) is 0.90, 0.75 and 0.35 respectively. What should the company do and what is the expected monetary value of your suggested course of action?	10	01/02	05
Q6	Maximize $p = 2x - 3y + z$ subject to $x + y + z \le 10$ $4x - 3y + z \le 3$ $2x + y - z \le 10$ $x \ge 0, y \ge 0, z \ge 0$	10	03	06
	Source/ destination / **1** / **2** / **3** / **4** / **Supply** **1** / **2** / **3** / **4** / **5** / **6** **2** / **5** / **4** / **3** / **1** / **8** **3** / **1** / **3** / **3** / **2** / **10** **Demand** / **4** / **6** / **8** / **6** Calculate the initial feasible solution for Transportation problem by (a) N-W Corner Method (b) Least Cost method.	10	03	06
Q.7	A) What do understand by Genetic Algorithm?	12	03	07

	Explain stages involved in Genetic Algorithm analysis. Also state applications of GAs in Civil Engineering problems.			
	B) Outline the similarities and differences between Genetic Algorithms and Evolutionary Strategies.	08	03	07

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End Semester Re-Examination, June- 2018

Q. P. Code:
Duration: 3 hour
Program: Civil

Max. Marks: 100
Class: B.Tech. Semester: VII
Name of the Course: Environmental Engg.II
Course Code : **BTC- 404**

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams wherever required
4. Assume suitable data if necessary

	Question No. 1 (attempt any four)	Maximum Marks	C.O.	Mod.
Q1	(i) When the drop manhole is used in sewers?	**05**	C.O.1	03
	(ii) What do you meant by sewage farming?	**05**	C.O.1	04
	(iii)How does air pollution affects human health?	**05**	C.O.1	01
	(iv)Distinguish between fixed film and suspended growth process	**05**	C.O.1	06
	(v) Highlight the importance of sludge volume index in sewage treatment?	**05**	C.O.1	05
	(vi) Discuss the causes of soil pollution.	**05**	C.O.1	02
Q2	**(a)** Explain the stages of self purification of stream.	**04**	C.O.3	4
	(b) A sewerage system is designed to serve a population of 95000 persons with water supply rate of 250 litres per head per day. The sewage generated is required to be lifted for 15 m of static head and at 120 m distance. Determine the diameter of rising main, size of sump well and horsepower required for pump (consider head loss due to bends and valves of 0.35 m).	**10**	C.O.1	3
	(c) Discuss in detail causes of sludge bulking	**06**	C.O.2	6
Q3	**(a)** Determine the size of high rate trickling filter for following data: (i) Sewage flow = 6.0 MLD (ii) Recirculation ratio = 1.5 (iii) BOD_5 of raw sewage = 300 mg/lit (iv) BOD_5 removal in PST = 30% (v) Final effluent BOD_5 desired = 30 mg/lit Also calculate hydraulic loading and organic loading?	**10**	C.O.1	6
	(b) Explain the various factors to be considered for selection of sewer materials.	**05**	C.O.2	4
	(c) Discuss the effects of air pollution on plant and animals.	**05**	C.O.1	1

Q4	**(a)** Discuss in detail carbon cycle and ozone layer depletion. **(b)** Design a screen channel for a peak sewage flow of 40 MLD. Size of bar = 10 mm x 40 mm, Spacing = 30 mm, Angle of inclination = 50^0. Diameter of incoming sewer = 0.75 m	**10** **10**	C.O.1 C.O. 1	1 6
Q5	**(a)** Design a continuous flow complete mix activated sludge process to yield an effluent BOD_5 of 20 mg/L. The influent BOD_5 following primary clarification is 180 mg/L. The waste flow is 10 m^3/min. Take Y=0.65, k_d=0.05, θ_c=10 days, MLVSS=3000 mg/L and return sludge concentration is 15000mg/L of SS and MLSS/MLVSS=0.8. **(b)** What do you mean by soil contamination? Discus the methods used to remediates the same.	**10** **10**	C.O.1 C.O.2	4 2
Q6	**(a)** Design septic tank and dispersion trench for a colony of 300 people using rational method where the water demand is 150 lpcd. b) Explain with neat sketch catch basin and drop manhole. c) What are the factors affects Self purification of stream.	**08** **06** **06**	C.O.1 C.O.3 C.O.2	6 3 4
Q7	**Write short notes on the following :** **a)** Green House effect **b)** Role of state board as per water Act 1974 **c)** Septic tank **d)** Extended aeration process **e)** Sludge drying bed	 **04** **04** **04** **04** **04**	 C.O.1 C.O.1 C.O.3 C.O.2 C.O.2	 1 7 6 4 4

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RE- EXAMINATION

JUNE 2018

Program: Civil Engineering
B. Tech.
Course code: BTC 403
Name of the Course: Water Resources Engineering
Semester: VII

Duration: 3 hr
Maximum Marks: 100

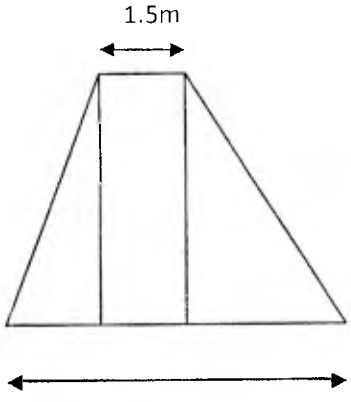
Instructions:

1. **Attempt any five questions.**
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly

Que. No.		Max. Marks	Course Outcome Number	Module No.
Q1(a)	Explain with a neat diagram the entire process and hydrological cycle.	7	CO2	1
(b)	State the methods of application of irrigation water and explain the surface irrigation flow system in detail.	7	CO1	1
(c)	Compute the average precipitation by the arithmetic average method and Thiessen polygon method	6	CO2	3

Station No	Precipitation in mm	Area Sq Km
1	30.8	45
2	34.6	40
3	32	30
4	24.6	38

Q2 (a)	A water course has a culturable command area of 1200 hect. The intensity of irrigation for crop A is 42% and for crop B is 37%, both the crops being Rabi crops. Crop A has a kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of the water course if the kor depth for crop A is 10cm and for B it is 16cm.	7	CO1	2
(b)	Discuss the causes of water-logging. Suggest suitable remedial measures to solve the problem of water-logging.	7	CO1	2
(c)	Explain the forms of precipitation.	6	CO2	3
Q3 (a)	Define and explain terms Aquifer, Aquitard, Aquifuge And Aquiclude	6	CO2	4
(b)	Describe weighing bucket type rainguage	6	CO2	3
(c)	Discuss the methods of improving duty	8	CO2	2

Q4 (a)	Derive an expression for steady state discharge through a tube well fully penetrating a unconfined aquifer.	6	CO1	4
(b)	Discuss the about sedimentation in a reservoir.	6	CO4	5
(c)	Discuss in detail the classification of dam	8	CO2	6
Q5 (a)	A masonry dam 10 m high is trapezoidal in section with a top width of 1.5 m and bottom width of 8.25m. Face exposed to water has a batter of 1:10 Calculate: i. FOS against sliding ii. FOS against overturning iii. Shear Friction Factor (SFF) Is it safe in sliding and overturning, assuming μ=0.75, Unit weight of masonry=2240kg/m^3. Permissible shear stress of joint=14kg/cm^2 	12	CO4	6
(b)	List different types of spillway and Explain ogee spillway.	8	CO1	5
Q6 (a)	Design the most economical lined trapezoidal section for an irrigation channel to carry a discharge of 11.4 m3/sec on a bed slope of 0.10% Take manning's n=0.025. If the channel is excavated in firm clay for which recommended side slopes are 1.5H:1V, what would be the dimensions of the channel?	10	CO4	6
(b)	Discuss the stability requirement of Gravity dam	10	CO3	6
Q7 (a)	Discuss the causes of failure of earth Dam	10	CO4	7
(b)	Explain Kennedy's and Lacey's Theory.	10	CO4	7

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ODD Semester Exam

June 2018

Q. P. Code:

Max. Marks: 100 Duration: 3 hr

Class: B.TECH Semester: VII Program: Civil Engineering

Name of the Course: Construction Engineering Course

Code : BTC402

Instructions:

Paper setter is requested to give necessary instructions.

- Q.1 is compulsory & attempt any four questions out of remaining six.
- Assume suitable data if required.
- Sketches are necessary & carry equal marks.
- Answers to all sub-questions should be grouped together.

<table>
<tr><th>Question No</th><th></th><th>Maximum Marks</th><th>CO</th><th>Module No.</th></tr>
<tr><td>Q1</td><td>Attempt any four:
• Modern Framework system
• Lining of Tunnel
• Advantages of pre-cast concrete construction
• Excavation equipment's
• Stone column.
• Types of Cladding</td><td>20</td><td>1-3</td><td>1-7</td></tr>
<tr><td>Q2 (a)</td><td>Enlist the costs to be considered in determining the economic life of construction equipment. Briefly discuss each cost.</td><td>08</td><td>01</td><td>01</td></tr>
<tr><td>(b)</td><td>Determine the cost per hour for owning & operating a clamshell with following particulars,
<table>
<tr><td>Actual Cost</td><td>Rs.20 Lakh/-</td></tr>
<tr><td>Salvage cost</td><td>Rs 3.0 Lakh</td></tr>
<tr><td>Engine</td><td>35Disel</td></tr>
<tr><td>Investment cost</td><td>13% avg. investment</td></tr>
<tr><td>Lubrication cost</td><td>25% fuel cost</td></tr>
<tr><td>Operating cost</td><td>0.65</td></tr>
<tr><td>Useful life</td><td>10 years</td></tr>
</table></td><td>12</td><td>01</td><td>1,2</td></tr>
</table>

	Operating hours per year	2800			
	Operating salary	Rs.7500/month			
	Maintenance & repair	Same as depreciation			
Q3 (a)	Write a note on transporting & handling of explosives.		05	03	03
. (b)	What are the different methods of tunneling in hard rock? Explain the step by step " Drift method " for tunnel construction		10	02	04
. (c)	Write a note on Vacuum Concreting.		05	03	06
Q4 (a)	Explain the construction & working of power shovel with neat sketch		08	01	02
. (b)	Suggest suitable machinery, equipment and techniques for the construction of bridge over railway track having a span of 20 m using precast girders.		08	01-03	1,2
(c)	State the factors affecting the selection of drilling equipment.		04	1	1,2
Q5(a)	Draw a line sketch of tower crane and label its essential components.		05	02	2
(b)	Describe in detail various grouting techniques used in the field		07	03	05
(c)	What are common hoisting equipment's used in construction industry?		08	02	07
Q 6 (a)	Write a short note on: 1. Under water concreting 2. Use of geotextile 3. ventilation in tunnel 4. sand drains		20	02-03	4,5,6
Q7 (a)	What do you mean by mass concreting? Explain in detail how to control temperature rise in mass concreting structures.		08	01/03	06
(b)	Explain construction & working tunnel boring machine & pipe jacking method		08	01/03	04
(c)	Explain the working of diaphragm wall with neat sketch.		04	01/03	05

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KT-EXAM

Max. Marks: 100
Duration: 3 hr
Class: Btech
Name of the course: Limit State Method for RC Structures

Q.P. Code: BTC 401
Course Code : BTC 401
Sem-VII
Program: Civil Engineering

Instructions:

1) Question No. 1 is compulsory.
2) Attempt any four from the remaining questions.
3) Draw reinforcement details wherever necessary.
4) Use of IS 456:2000 is permitted.

Question No			Maximum Marks	Course Outcome Number	Module Number
1	a)	State the assumptions made in LIMIT State of collapse(Flexure).Also draw stress and strain diagram across the section.	05	1	2
	b)	What do you mean by Limit State. Explain various limit states.	05	1	2
	c)	When it is required to design doubly reinforced beam section.Also draw various forms of shear reinforcement provided in beam.	05	1,2	3
	d)	Derive design stress block parameters for singly RC sections for LSM of design.	05	1,2	2
2	a)	RC section 230mmx500mm depth overall and reinforced with 4-20mm dia is used as simply supported beam over an effective span of 6m. Determine the maximum udl beam can carry safely.Use M 25 and Fe-500	10	1,2	3
	b)	A rectangular beam 300mm x500mm effective depth is reinforced with 4 bars of 20mm dia in tension zone .The beam is subjected to udl of 50kN/m over span of 7m.Design shear reinforcement.Use M30 and Fe 500	10	1,2	3
3)	a)	A RCC beam reinforced on tension side is 230mm wide with an effective depth of 500mm.It is reinforced with 4 bars of 20mm diameter .Calculate the ultimate moment of resistance using Ultimate Load Method. Take $\sigma_{cu}=20N/mm^2$ and $\sigma_{sy}=425N/mm^2$.	10	1	1

	b)	A TEE beam section having an effective depth of 450mm ,flange width of 1450mm ,rib width of 450mm ,slab depth of 150mm comprises of 7 bars of 25mm diameter. Calculate moment of resistance of beam. Use M-25and Fe-415.	10	1,2	4
4)	a)	Draw Pu-Mu curve for column of given proportions. Explain Region II and III of the curve in detail.	10	1,2	6
	b)	Design short helically reinforced column to resist service load of 1600kN.Use M30 and Fe 415.Draw reinforcement details.	10	1,2	6
5)	a)	Design a RC slab for an interior panel of a passage of a residential building. The size of panel is 3mx 3m.Using appropriate loading , design the slab panel. Give appropriate checks. Use M30 and Fe 415.	16	1,2	5
	b)	Explain in brief Whitney's theory.	04	1,2	1
6)	a)	A rectangular column of dimension 300mmx450mm is subjected to an ultimate axial load of 1000kN.Design isolated footing for column assuming SBC as 250kN/m^2.Use M25 and Fe 415.	15	1,2	7
	b)	Write a short note on various types of footing under various conditions showing sketches.	05	1,2	7
7)	a)	A RCC beam 250mm x450mm effective is subjected to an axial moment of resistance of 224kN-m.Find out the steel required using Ultimate Load Method. Take σ_{cu}=20N/mm^2 and σ_{sy}=425N/mm^2	10	1	1
	b)	Design one way slab panel of RCC residential building having dimensions 3mx7m. Using LL=2kN/m2 and F.F=1.5kN/m2 , design the slab panel. Give appropriate checks. Use M25 and Fe 415.	10	1,2	5