Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058

END SEM May 2019 Examinations

Program: Civil Engineering
Course Code: PCBTC407
Course Name: Soil Mechanics

Duration: 3hr
Maximum Points: 100
Semester: IV

Instructions:

1. **Question No. 1 is compulsory;** attempt any 4 questions out of remaining 6 questions.
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly

Q. No.		Questions	Points	CO	BL	PI
1	a	A sample of saturated cohesionless soil tested in a drained triaxial compression test showed an angle of internal friction of 30 degrees. Calculate the deviatoric stress at failure for the confining pressure of 200 kpa.	3	CO2	BL3	1.3.1
	b	Describe briefly each type of soil structures with neat sketches.	6	CO1	BL2	1.3.1
	c	A soil has a liquid limit of 27% and a flow index of 12.5%. If the plastic limit is 17%, determine the plasticity index and toughness index. If the water content of the soil in its natural condition in the field is 20%, find the liquidity index and the relative consistency.	6	CO2	BL3	1.3.1
	d	Write down the advantages of Direct shear test.	5	CO2	BL2	1.3.1
2	a	Discuss the use of soil classification in Geotechnical Engineering.	6	CO1	BL2	1.3.1
	b	For saturated soil of mass 1.540 kg determine water content, void ration and dry density if oven dried mass is 1.020kg. The volume of the wet soil is known as 945ml	6	CO2	BL4	2.1.3
	c	Determine the coefficient of permeability for uniform sand for which sieve analysis indicated that D_{10} size is 0.12 mm	2	CO2	BL3	1.3.1
	d	Derive expression for the torque at failure in case of vane shear test when only one portion of vane take part in shearing.	6	CO1	BL1	1.2.1

3	a	Results obtained from the sieve analysis of the soil are given below.	8	CO2	BL4	2.1.3

Draw the particle size distribution curve and determine the effective size, uniformity coefficient and coefficient of curvature of the soil.

Mesh Opening (mm)	2.4	1.2	0.6	0.3	0.15	0.075	Pan at the bottom
Weight of Soil retained(gm)	0.0	5.0	25.0	215.0	225.0	25	0.5

	b	A compacted sample of soil with bulk density of 2.0g/cm^3 has a water content of 15%. Calculate its dry density degree of saturation and air content. G= 2.65.	7	CO2	BL2	2.1.3
	c	Discuss flow net along with their properties	5	CO1	BL1	1.3.1
4	a	In a falling head permeability test, the initial head causing flow was 50cm and it drops 5 cm in 10 minutes. How much time would be required for the head to fall to 25 cm. If the soil sample is 10 cm in height and 50 cm^2 in cross sectional area, calculate the coefficient of permeability. Area of stand pipe=0.5 cm^2	7	CO2	BL4	2.1.3
	b	Discuss in detail purpose of soil investigation with reference to Earthen dam Site.	8	CO4	BL6	1.3.1
	c	State the assumptions made Boussinesq's Theory.	5	CO1	BL1	1.3.1
5	a	Water percolates through a rectangular earth fill 30 m long, 15m wide and 20m thick. The fill is founded on an impervious stratum and has a water of depth 5m on one side. Compute the seepage discharge in m^3/day. Take K= 0.15cm/minutes	7	CO2	BL3	2.1.3
	b	The standard soil compaction test result are as follows	10	CO2	BL3	2.1.3

Trial No.	Moisture Content % by dry weight	Wet weight of Compacted soil (kN/m^3)
1	8.30	19.8
2	10.50	21.3
3	11.30	21.6
4	13.40	21.2
5	13.80	20.8

G= 2.65,Plot the following
Water content v/s Dry density curve, zero air void curve and 90% saturation line. Determine OMC and corresponding MDD. The material retained on 20mm sieve, which was 9% was eliminated. Specific gravity of oversize particles was 2.79

	c	List the factors affecting permeability	3	CO1	BL1	1.3.1
6	a	A series of shear tests were performed on a soil.	8	CO2	BL1	1.3.1

Each test was carried out until the sample sheared and the principal stresses for

		each test were. Plot Mohr's circle and hence determine strength envelope and angle of internal friction. Test No. | KN/m^2 | KN/m^2 1 | 200 | 600 2 | 300 | 900 3 | 400 | 1200				
	b	In consolidation test the void ratio of soil sample decreases from 1.2 to 1.1 when the pressure is increased from 200 to 400kN/m². Calculate the coefficient of consolidation if coefficient of permeability is 8.0×10^{-7} mm/sec.	8	CO2	BL3	2.1.3
6	c	Differentiate finite and infinite slope	4	CO1	BL1	1.3.1
7	a	A concentrated load of 2500 kg acts on the surface of a homogenous soil mass of large extent. Find the stress intensity at a depth of 15 m (a) Directly under the load and (b) At a horizontal distance of 7.5 meters away from the axis of loading. Use Boussinesq's equation.	6	CO3	BL3	2.1.3
	b	Discuss sand boiling phenomenon	8	CO1	BL1	1.2.1
	c	Distinguish between Standard Proctor Test and Modified Proctor Test.	6	CO1	BL1	1.2.1

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END SEM May 2019 Examinations

Program: Civil Engineering
Course Code: PCBTC407
Course Name: Soil Mechanics

Duration: 3hr
Maximum Points: 100
Semester: IV

Instructions:

1. **Question No. 1 is compulsory;** attempt any 4 questions out of remaining 6 questions.
2. Neat diagrams must be drawn wherever necessary.
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2	a	Discuss the use of soil classification in Geotechnical Engineering.	6	CO1	BL2	1.3.1
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	c	Determine the coefficient of permeability for uniform sand for which sieve analysis indicated that D_{10} size is 0.12 mm	2	CO2	BL3	1.3.1
	d	Derive expression for the torque at failure in case of vane shear test when only one portion of vane take part in shearing.	6	CO1	BL1	1.2.1

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6	c	Differentiate finite and infinite slope	4	CO1	BL1	1.3.1
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End Semester – May 2019 Examinations

Program: Civil Engineering
Course Code: PC-BTC 406
Course Name: Transportation Engineering-

Duration: 3 Hour
Maximum Points: 100
Semester: IV

Notes:
Attempt any Five Questions
Figures to the right indicate full marks.
Assume suitable data if necessary and state the same clearly

Q.No.	Questions	Points	CO	BL	PI
1	**Attempt any Four** **a)** Draw neat sketch of P-way and state the functions of sleepers. **(5)**	20	4	3	1.3.1
	b) Discuss the advantages and disadvantages of air transport. **(5)**		2	2	1.3.1
	c) Discuss the social and economical benefits of transportation. **(5)**		1	2	1.3.1
	d) Define sleeper density and using sleeper density (N+5), find out the number of sleepers required for constructing a BG and MG track of 1km length. **(5)**		4	1	1.3.1
	e) Define calm period, crosswind component and wind coverage with neat sketch. **(5)**		3	1	1.3.1
2	**a)** Explain various the factors affecting airport site selection. **(10)**	20	2	1	1.3.1
	b) Discuss various characteristics of aircraft affects planning and designing of airport**(10)**		2	2	1.3.1
3	**a)** Discuss step by step procedure to draw type-1 Wind Rose diagram with figure. **(6)**		3	2	1.3.1
	b) Describe the various systems of aircraft parking. **(6)**		3	3	1.3.1
	c) Design an exit taxiway which joins a runway and a main parallel taxiway. The total angle of turning is 30^0 and the turn off speed is 80kmph. Draw a neat sketch and indicate all the design elements. **(8)**	20	3	5	2.1.3
4	**a)** The length of the runway under standard conditions is 2200m. Airport is to be provided at an elevation of 410m above MSL. Airport reference temperature is 32° C. Calculate the corrected length of the runway for the following data. **(10)**	20	3	5	2.1.3

Chainage (m)	0 to 300	300 to 900	900 to 1500	1500 to 1800	1800 to 2200	2200 to 2600
Gradient %	+1	-0.5	-0.5	+1	-0.5	-0.4

	b) Enlist various runways marking and explain **any two** with neat sketch. **(6)**		3	2	1.3.
	c) Enlist various imaginary surfaces any explain **any one** with neat sketch. **(4)**		2	2	1.3.1
5	a) A 5° BG branch line track takes off from a main line track of a 3° curvature. Due to the turnout, restricted speed on the branch line is 25 km/h. calculate the negative super elevation to be provided on the branch line track and the maximum permissible speed on the main line track. **(10)**	20	5	5	2.1.3
	b) Briefly discuss conning of wheels and tilting of rails. **(5)**		4	2	1.3.1
	c) State the characteristics of good ballast material. Explain any two ballast materials used in India with advantages and disadvantages. **(5)**		4	2	1.3.1
6	a) Draw and discuss all the necessary elements of a RH turnout. **(8)**	20	5	3	1.3.1
	b) Draw a neat sketch on a turnout showing lead and radius as per **Cole's method** and Calculate the curved lead, switch lead, lead and radius of a 1 in 8.5 BG turnout for 90 R rails using Cole's method. Take heel divergence 13.5 cm (7)		5	5	1.3.1
	c) Enlist various types of yards and explain marshalling yard in detail **(5)**		5	2	1.3.1
7	a) Calculate the superelevation, maximum permissible speed, and Transition length for a 2° curve on a high-speed BG section with a maximum sanctioned speed of 110 km/h. Assume the equilibrium speed to be 80 km/h and the booked speed of the goods train to be 40 km/h. **(10)**	20	5	5	2.1.3
	b) Define creep and explain various theories of creep. **(5)**		4	1	1.3.1
	c) Draw a neat sketch showing various runway patterns and differentiate between parallel and intersecting runways. **(5)**		3	1	1.3.1

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SARDAR PATEL COLLEGE OF ENGINEERING

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End Semester Examination May 2019

Civil Engineering

Max. Points: 100 **Duration:** Three Hours

Class: S.Y. (Civil), Semester: IV **Program:** U.G. (B. Tech. Civil)

Name of the Course: Hydraulic Engineering **Course Code :** PC-BTC405

Instructions:

i. Attempt ***Any Five*** questions
ii. All questions carry equal marks
iii. Answer to each question to be started on the fresh page
iv. Assume suitable data if necessary and mention it clearly.
v. Draw neat diagrams and indicate it clearly.

Q. No.	Questions	Points	CO	BL	PI
1	(a) Discuss hydraulic model testing, laws of similarities, distorted and undistorted models in dimensional analysis and highlight the importance of scale effects in hydraulic model testing.	10	CO4	BL2	1.1.2
	(b) The rate of flow 'Q' over a triangular notch is found to depend on the head of water 'H' above the vertex, the density 'ρ', the kinematic viscosity 'υ', the surface tension 'σ' of the fluid, 'θ' the angle of the notch and 'g' the acceleration due to gravity. Express a rational relationship for 'Q' in terms of other variables given. Use any one method of dimensional analysis.	10	CO4	BL4	4.1.4
2	(a)Explain the phenomenon of water hammer flow in pipelines and show pressure variation for full length of pipe w.r.t. to time. Discuss elastic pipe theory and rigid pipe theory.	10	CO1	BL2	1.1.2
	(b) A siphon of length 800 m has its vertex 6 meters above the water level in the upper reservoir. The length of inlet leg of siphon is 200 m and total head loss in siphon is 20 m. Determine diameter of the siphon such that pressure at summit does not fall below vapor pressure of water. Take f = 0.021.	10	CO1	BL4	2.4.1
3	(a)Show that the efficiency of a free jet striking normally on a series of flat plates mounted on the periphery of a wheel can never exceeds 50%.	10	CO2	BL4	1.2.1
	(b) A jet of water moving at 20 m/sec impinges on a symmetrical curved vane shaped to deflect the jet through 120^0 such that the vane angles 'θ' and 'Φ' are each equal to 30^0. If the vane is moving at 5 m/sec, find the angle of the jet so that there is no shock at inlet. Also determine the absolute velocity of exit in magnitude and direction and work done.	10	CO2	BL4	1.3.1

4	(a) A Pelton wheel develops 8000 kW under a net head of 130 m at a speed of 200 r.p.m. Assuming the co-efficient of velocity for the nozzle = 0.98, hydraulic efficiency = 87%, speed ratio = 0.46 and jet diameter to wheel diameter ratio = 1/9, determine (i) the discharge required, (ii) the diameter of the wheel, (iii) the diameter and number of jets required, and (iv) the specific speed. Assume mechanical efficiency = 75%.	10	CO2	BL5	2.2.3
	(b) A reaction turbine works at 450 r.p.m. under a head of 120 meters. Its diameter at inlet is 120 cm and the flow area is 0.40 m^2. The angles made by absolute and relative velocities at inlet are 20^o and 60^o respectively with the tangential velocity. Determine: (i) The volume flow rate, (ii) The power developed, and (iii) Hydraulic efficiency. Assume whirl at outlet to be zero.	10	CO2	BL5	2.2.3
5	(a)Explain characteristics curves of centrifugal pump: (i) Main characteristics curves, (ii) Operating characteristics curves, and (iii) Constant efficiency curves.	10	CO2	BL2	2.2.3
	(b) A centrifugal pump discharges 0.15 m^3/sec of water against a head of 12.50 m the speed of the impeller being 600 r.p.m. The outer and inner diameters of impeller are 500 mm and 250 mm respectively and the vanes are bent back at 35^0 to the tangent at exit. If the area of flow remains 0.07 m^2 from inlet to outlet, Calculate (i) Manometric efficiency of the pump, and (ii) Vane angle at inlet.	10	CO2	BL5	2.2.3
6	(a) Differentiate between; Prismatic and non-prismatic channel.	05	CO3	BL2	2.1.2
	(b) Differentiate between flow through pipes and flow through channel.	05	CO3	BL2	2.1.2
	(c) Classify types of flow in an open channel hydraulics.	05	CO3	BL2	2.1.2
	(d) Derive Chezy's equation for velocity of flow through an open channel.	05	CO3	BL2	2.1.2
7	(a)Derive an expression for most economical triangular channel section and state the conditions for it.	10	CO3	BL4	1.2.1
	(b) Derive dynamic equation for gradually varied flow in case of a wide rectangular channel. Explain all the terms used.	10	CO3	BL4	4.1.4

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END SEMESTER EXAMINATION

Program: **B.Tech. in Mechanical Engineering** Date:**May-2019**
Class: **Second Year B.Tech.(Civil/Electrical)** Duration: **3Hr.**
Course code:**MC-BT002** Max.Points:**100**
Name of the Course:**Indian Traditional Knowledge** Semester:**IV**

Instructions: Solve**ANY FIVE** Questions.

		Points	CO	BL	PI	Module
Q.1	**a) Explain:**"*India is the Richest Prize in the World in all respects.*"**Justify:** withsuitable examples.	**(10)**	1	V	6.1.1	1
	b) Justify:"*Nature never distinguished any other country so completely a unit as India.*" in context of Fundamnetal unity of India since ancient timesgiving suitable examples.	**(10)**	1	V	6.1.1	1
Q.2	**a) List:** Names of The Vedas and Upvedas.**Justify:**"*Vedas are the oldest and most valuable treasure of knowledge in the library of mankid*".	**(10)**	1	I,V	6.1.1	2
	b) Explain: Importance of upvedas in indian tradition and knowledge system.	**(10)**	1	V	6.1.1	2
Q.3	**a)Explain:** With suitable one example each for thegreatness of ancient indian wisdom in science and spirituality.	**(10)**	1,2	V	6.1.1	3
	b) Explain: Co-existence of Science and Spirituality in India since ancient times with suitable examples and**Justify:**its relevance with modern times.	**(10)**	1,4	II,V	6.1.1	3
Q.4	**a) Explain:** Any two significant medical practices followed in ancient India.	**(10)**	2	II	6.1.1	4
	b) **Define:** Yoga. **Justify:***"Yoga is the key for long life with good health"* in context of ancient as well as modern India.	**(10)**	2	I,VI	6.1.1	4
Q.5	**a) Discuss:** Any two significant art forms in ancient India and Any Two valuable contributions by ancient Indian artists for the development of these art forms.	**(10)**	3	VI	6.1.1	5
	b) Justify: Advancement of Civil Engineering, Architecture and Town Planning in ancient India with suitable examples.	**(10)**	2,3	V	6.1.1	5
Q.6	**a) Explain:** Rich heritage of Indian Traditional Languages since ancient times..	**(10)**	3	II	6.1.1	6
	b) Discuss:Work of Saint Dnyaneshwar and his contribution to Indian society as a Yogi, Saint, Linguist and Philosopher.	**(10)**	2,3	VI	6.1.1	6,7
Q.7	**a) Discuss:** Teachings of Bhagwan Gautam Buddha andits **Importance**in today's modern independent India.	**(10)**	3,4	V, VI	6.1.1	7

	b) Justify: *" Teachings of Ancient Indian Saints are the Pearlsof Widom for the entire mankind."* with context to Teachings of Bhagwan Mahavir Vardhaman.	**(10)**	3	V	6.1.1	7

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End Semester Examination, May- 2019

Q. P. Code:

Max. Marks: 100 Duration: 3 hour

Class: S.Y.B.Tech. Semester: IV Program: Civil

Name of the Course: **Surveying & Geomatics** Course Code : **PC- BTC- 404**

Instructions:

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

Question No. 1 (solve any **five** from **a** to **g**)		**Points**	**CO**	**BL**	**PI**
Q1	(a) Explain working principle of digital Theodolite.	**4**	1	1	1.3.1
	(b) Highlight the significance of Laplace station in the triangulation system.	**4**	2	1	1.3.1
	(c) Explain the term phase of a signal.	**4**	1	2	1.4.1
	(d) State the applications of Remote sensing.	**4**	3	2	1.4.1
	(e) Discuss the requirements of ideal transition curve.	**4**	2	1	1.3.2
	(f) What is Subtense Theodolite? Where it is used?	**4**	1	1	1.3.1
	(g)State the advantages and limitations of Photogrammetry.	**4**	2	2	1.4.1
Q2	**(a)** A highway curve having a deflection angle of 78^0 is to be desire for a maximum sped of 120 km/hr, a maximum centrifugal ratio of ¼ and a minimum rate of change of radial acceleration of 0.3 m/sec^2/sec. the combined curve consist of two cubic spirals and a circular curve. Calculate (1) The radius of the circular curve (2) The length of the cubic spiral (3) The total length of the combined curve (4) The chain ages of all salient points if the chain age of the point of intersection is 3100m:	**07**	1	2	2.3.2
	(b) Prepare the data necessary for setting out transition curve and central circular curve from above data using deflection angle method. (Assume peg interval of 30 m).	**08**	2	2	2.1.2
	(c) Explain in brief working of Global Positioning Systems.	**05**	3	1	1.4.1
Q3	**a)** An upgrade of + 1.8 % meet with another upgrade of + 1.2 %. Determine the reduced levels of the various stations on the curve using chord gradient method. Assume rate of change of grade to be 0.05% per 20 m chain and the chain age and elevation of the point of grade separation are 1500 m and 360 m, respectively.	**10**	2	2	2.3.2

	b) Explain the procedure for setting out compound curve by deflection angle method.	**10**	2	1	1.4.1
Q4	**(a)** A ground area 40 km X 25 km is to be covered by aerial surveying. Prepare flight plan from the following data: (i) Size of photograph-230mm X 230 mm (ii) Scale (R.F.) = 1:25,000; Average terrain height = 480m (iii) Longitudinal overlap – 60%, side lap – 30 %. (iv) focal length (f) =152.3 mm; speed of air craft = 220 km/hr	**10**	3	3	2.3.2
	(b) Why parabola is preferred instead of circle for setting out vertical curve?	**04**	1	1	1.3.1
	(c) How would you measure strength of figure in triangulation?	**06**	2	2	2.3.1
Q5	**(a)** Two tangents intersect at a chainage of 2450 m and angle of intersection between them is 130^0. Enumerate the data required for simple curve having back tangent length = 116.58 and Peg interval = 30 m using Rankine's method.	**10**	1	2	2.1.2
	(b) How would you measure strength of figure in triangulation?	**05**	2	1	1.3.1
	(c) Write a short note on axis signal correction	**05**	1	1	1.4.1
Q6	**(a)** Explain with neat sketch process of remote sensing.	**06**	3	1	1.4.1
	(b) Discuss in brief towers and signals	**05**	1	1	1.4.1
	(c) The following observations were made with a tacheometre having K=100 and C=0.2. Find the R.L. of stations M, N and P considering staff held **vertical.**	**09**	2	2	2.3.2
Q7	(a) There are two stations P and Q at elevations of 200 and 995m, respectively. The distance of Q from P is 105 km. If the elevation of peak M at a distance of 35 km from P, 301 m. Determine whether Q is visible from P or Not. If not, what would be the height of scaffolding required at Q, so that Q becomes visible from P.	**10**	3	2	2.3.2
	(b) Discuss in brief secondary triangulation.	**05**	2	1	2.3.1
	(c) Explain the various applications of Total station	**05**	1	1	1.4.1

Inst. St^n	Staff St^n	HI	Stadia readings	Vertical angle	Remark
O	M	1.35	1.325 1.570 1.815	-3 ° 52'	RL of O = 165.50 m
O	N	1.35	2.225 2.540 2.855	+ 4° 32'	
N	P	1.20	0.980 1.220 1.460	+ 5° 15'	

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SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)

Munshi Nagar Andheri (W) Mumbai 400058

End Semester examination
May 2019

Max. Marks: 100 **Duration: 3 Hrs**

Class: S.Y. B. Tech **Semester: IV**

Name of the Course: Environmental Engineering I **Program: B. Tech Civil**

Course Code: PC- BTC408

Instructions:

Question one is compulsory
Attempt any four of remaining six questions
Draw neat sketches/diagrams wherever required
Assume suitable data if necessary and state them clearly
Figure on right indicate **maximum points** for the given question, **course outcomes attained, Bloom's Level** and **Performance Indicators**

Q1	**Fill in the blanks**	(20)	CO	BL	PI
(a)	1. _____ and _____ are the coagulants used in water treatment. 2. _____ and _____ are two methods to remove salts in water treatment 3. _____ and _____ is used to remove salinity in water. 4. _____ process is used to clean rapid sand filter and_____ to clean slow sand filter 5. Aeration of water removes_____ and _____.	(10)	1,2	2	1.2.1
(b)	Differentiate ground and surface water. Explain the need of water supply schemes. Draw components of water supply scheme	(10)	1,2	2	3.2.1
Q2	**Answer the following questions**	(20)			
(a)	Draw the flowsheet of conventional surface water treatment plant in detail. Explain in detail the function of each unit. The reductions of turbidity and pathogens after each unit should be mentioned. Explain additional units/treatment required to remove Iron and Manganese in the surface water	(10)	1,2,3	3,4	3.3.1
(b)	Explain per capita demand and its components (various demands) as per IS 1172. Explain factors affecting per capita demand.	(10)	1,2	3,4	5.3.1
Q3	**Answer the following questions**				
(a)	A town of Dehradun in Uttarakhand has a population of **1,40,000 in 2010**. The water supply scheme is to be developed for the area for the year **2040**. The past census records are provided in **table 1**. Calculate the population for which water supply system is to be designed using any two appropriate methods for newly developing city.	(05)	1-3	4-5	3.4.2

Table 1.

Year	1970	1980	1990	2000	2010
Population	65,000	90,000	1,05,000	1,15,000	1,40,000

(b)	Song River flows through Dehradun and it requires to be check for various parameters before being used as a water source. As a city engineer which tests are to be conducted to find the potability of water. Explain any five physical, chemical and biological parameters that should be found out.	**(05)**	**1-4**	**4-5**	**6.3.2**
(c)	A **bell mouth canal intake is to be designed for Dehradun** considering population obtained in Q3 (a) drawing water from a canal which runs for 10 hrs a day with a depth of 1.8 m. Calculate head loss in intake conduit if treatment works are 0.75 km away. Draw a neat sketch. Consumption of the town is to be considered 100 lpcd. Assume velocity through screens and bell mouth to be less than 16cm/sec and 32 m/sec. ($V = 0.85\ CR^{0.63}\ S^{0.54}$ Take C= 130)	**(10)**	**1-4**	**3-4**	**4.3.1**
Q4	**Answer the following questions**				
(a)	Explain the following terms with typical values (i) Displacement efficiency (2) WLR (3) SOR (4)Filtration Rate (5) Temporal Mean Velocity Gradient	**(10)**	**1-3**	**3-5**	**3.2.1**
(c)	Explain process of **ion exchange**. Lime and soda were used for softening in Ranikhet for treatment of following impurities Ca SO_4= 200 mg/L; $Mg(HCO_3)_2$ = 220 mg/L; NaCl= 140 mg/L; Mg Cl_2= 300 mg/L. Compute the quantities of chemicals required for Dehradun in year 2040. Assume **soda ash and lime purity 90%. (Consider data in Q 3(a))**	**(10)**	**1-3**	**3-4**	**3.2.2**
Q5	**Answer the following questions**	**(20)**			
(a)	Explain the concept **Ideal Settling Tank. Design ideal** settling tank for the population for **the year 2040** for Dehradun town having average water demand **100 lpcd.**	**(10)**		**2-3**	**2.2.1**
(b)	Explain coagulation and flocculation. Design **a paddle flocculator** for Dehradun for **2040** with following details with average water demand as 100 lpcd: **Detention time= 15 min; Average G= 70s^{-1}; Speed of paddles = 3.5 rpm K=0.25; μ =1.0087X10^{-3} Ns/m^2; ρ=998 kg/m^3 at 20°C; Ratio of L: B= 3.**	**(10)**		**3-4**	**3.2.1**
Q6	**Answer the following questions**				
(a)	**Design rapid sand filter for (size, underdrainage system and wash water troughs)** for the population for **the year 2040** for Dehradun town having water demand **100 lpcd.**	**(10)**		**3-5**	**4.3.2**
(b)	Explain the characteristic of a good disinfectant. Explain disinfectants used in water treatment. Find chlorine consumed in kg/day and chlorine dosage in mg/L for the city of Dehradun in 2040 if the residual chlorine **is 0.2 mg/L** and a **chlorine demand is 0.6 mg/L and average water demand of 100 lpcd.**	**(10)**		**2-4**	**3.4.1**
	Answer the following questions	**(20)**			
(a)	**Explain with short notes** (a) Odor and color removal by any three methods (b) Reverse osmosis (c) Ion Exchange	**(10)**	**CO1 - CO4**	**1-2**	**4.2.3**
(b)	**Explain** the problems related to water and water pollution in Mumbai city and give unique solution of the problems	**(10)**	**CO2 - CO3**	**2-3**	**2.2.3**

Formula Sheet

$P_n = P_o\left[1+\frac{r}{100}\right]^n$ $P_n = P_o + n\bar{x} + \frac{n(n+1)}{2}\bar{y}$ $\log_e\left[\frac{P_s - P}{P}\right] - \left[\frac{P_s - P_o}{P_o}\right] = -kP_s * t$ $P_n = (P_o + n\bar{x})$ $r = \sqrt[n]{r_1 * r_2 * r_3 * \ldots\ldots * r_n}$	Al=27 Ca=20 C=12 O=16 S=32 Cl=35.5 H=1 Na=23 Fe= 55.5 Mg=24 Si=14	WLR=Q/B WLR= Q/2πR DT= V/Q SOR= 12-20 $m^3/d/m^2$ V= 0.849 C $R^{0.63}$ $S^{0.54}$ Leq = L_{50} +{ $(L_{10} - L_{90})^2$ / 60} NC = $L_{10} - L_{90}$ SOR= 24-30$m^3/d/m^2$
SA=volume/SOR	G =300-700s^{-1} 0.5 min to 1 min	P=$\frac{1}{2}C_d\rho.A_p.v_r^3$ $C_d = 1.8\ for\ flat\ paddles$ $\rho = 998kg/m^3$ $v_r = (1-0.25)v_p$
Ratio of length to diameter of lateral ≤ 60 Spacing of laterals= spacing of orifices= 150 to 300 mm Dia of perforations 5 to 12 mm (spacing 80 mm for 5 and 200 mm for 12mm) Total area of perforations≤ 0.5 Total c/s area of laterals Total area of perforation = 0.002 to 0.003 Entire filter area Area of manifold= 1.5 to 2 times laterals Rate of filtration = 300 to 500l/hr/m^2 Rate of filtration = 3000-6000l/hr/m^2 Max. demand= 1.8 Q	$v_s = \frac{1}{18}\frac{g}{v}(S_s - 1) * d^2$ Value of u=1.002X10^{-6} m^2/sec $v_d = \sqrt{\left(\frac{8\beta}{f'}\right)(S_s - 1)dg}$ $f' = 0.025 - 0.03$ g=9.8m/s^2	Q/A; Q/ perimeter; Q/b; V/Q V= D^2 (0.011D+0.785H)
$G = \sqrt{\frac{P}{\mu * V}}$ μ=1.0087*10^{-3}Ns/m^2		$G * t = \frac{V}{Q} * \sqrt{\frac{P}{\mu V}} = \frac{\sqrt{PV/\mu}}{Q}$

ALL THE BEST

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SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

Final exam - March 2019 Examinations

Program: B. Tech in Civil Engineering **Duration: 3 hours**

Course Code: PC- BTC403 **Maximum**

Points: 100

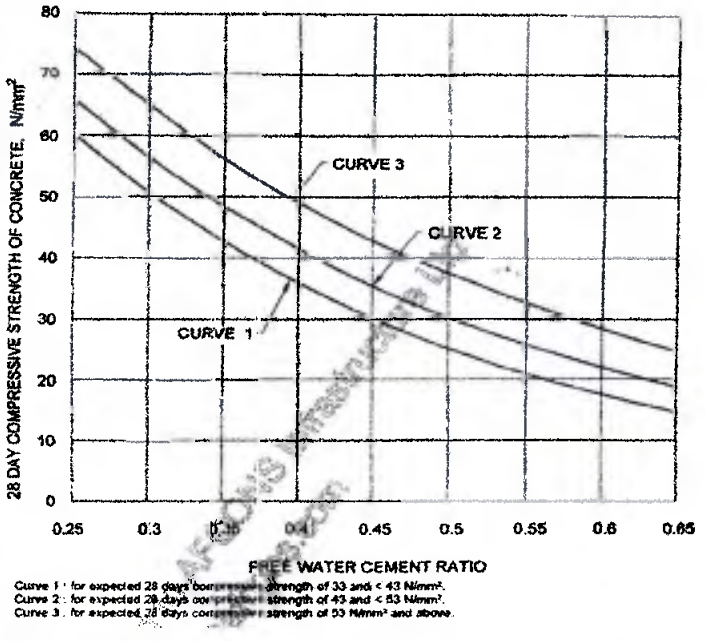
Course Name: Concrete Technology **Semester: IV**

Notes: Answers to all sub questions should be grouped together.

- Answer any 5 questions out of 7.
- Figures to the right indicate full marks.
- Assume suitable data, if necessary and state the same clearly.

Q. No.	Questions	Points	CO	BL	PI
1a	Determine the fineness modulus and zone of sand as per the sieve analysis given below: Sieve size / Weight retained (gms) 10 mm – 0 4.75 mm – 20 2.36 mm – 100 1.18 mm – 100 600 µ – 190 300 µ – 350 150 µ – 170 Pan – 35	5	1	4	1.2.1
1b	Design concrete for M45 grade using guidelines given in IS 10262 for the following data. Do the moisture correction of aggregate and calculate the final mix proportions. (Assume data, if not given) Grade of concrete – M45 Strength of cement – 65 MPa Maximum size of aggregate – 40 mm Minimum cement content – 350 kgs Maximum water cement ratio – 0.45 Workability – 120 mm Method of placement – Pumpable Specific gravity of 40 mm aggregate – 2.73 Specific gravity of 20 mm aggregate – 2.72 Specific gravity of 10 mm aggregate – 2.70 Specific gravity of fine aggregate – 2.62 Zone of sand – As determined in Q1a Total moisture content in 40, 20, 10 mm – 0.3% Total moisture content in fine aggregate – 3.0% Consider use of 50% GGBS as replacement of cement Type of coarse aggregate – angular coarse aggregate Superplasticiser with 30% water reduction capacity at 1%	15	2	4	1.2.1

dosage.



Curve 1 : for expected 28 days compressive strength of 33 and < 43 N/mm².
Curve 2 : for expected 28 days compressive strength of 43 and < 53 N/mm².
Curve 3 : for expected 28 days compressive strength of 53 N/mm² and above.

Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(4)	(5)	(6)
10	0.54	0.52	0.50	0.48
20	0.66	0.64	0.62	0.60
40	0.73	0.72	0.71	0.69

2 a.	Explain the phenomenon of alkali silica reaction and how to mitigate it.	10	3	1	1.6.1
2 b.	Explain the phenomenon of carbonation of concrete. Detail various factors that affect the rate of carbonation.	10	3	1	1.6.1
3 a.	Describe in detail various steps in wet process for manufacturing of Ordinary Portland Cement.	10	1	1	1.6.1
3 b.	Explain the various classification of aggregates.	10	1	1	1.6.1
4 a.	What is bleeding and segregation in concrete? How can it be controlled?	5	3	4	1.7.1
4 b.	List the various tests to be conducted for determining mechanical properties of aggregate. Describe any one test in detail.	5	1	1	1.2.1
4 c.	Explain briefly the layout of batching plant at site. Explain different components of batching plant and their utility.	10	3	2	1.2.1
5 a.	Explain briefly following types of cements and their use. a. Portland Pozzolana Cement b. Sulphate Resistant Cement	10	1	1	1.6.1
5 b.	Name any five tests conducted to assess durability of concrete? Also mention the durability parameter the test is conducted for.	5	3	1	1.7.1

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Final exam - ~~March~~ MAY 2019 Examinations

5 c.	What are mineral admixtures? Name four mineral admixtures and their sources.	5	1	1	1.6.1
6 a.	Why is curing of concrete important? Give four methods of curing in one sentence each.	5	3	2	1.6.1
6 b.	Specify the type of concrete to be used in the following situations: a Concrete used for pavements in building campus for maintaining the ground water table b. Build structure to cater to any severe impacts c. Eliminate expansion joints in bridges d. Support roof of tunnel during excavation e Absorb radiation from nuclear reactors	5	2	4	1.7.1
6 c.	What are the typical situations where non-destructive testing may be useful? Explain any four NDT tests in one sentence each.	10	3	2	1.6.1
7 a.	Explain any four types of repair methods in brief.	10	3	1	1.6.1
7 b.	Explain the procedure for repair of cracks in concrete.	5	3	1	1.6.1
7 c.	Explain the advantages of using fibre reinforcement for strengthening of concrete structures. Explain the procedure for applying fibre reinforcement.	5	3	1	1.7.1

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SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058

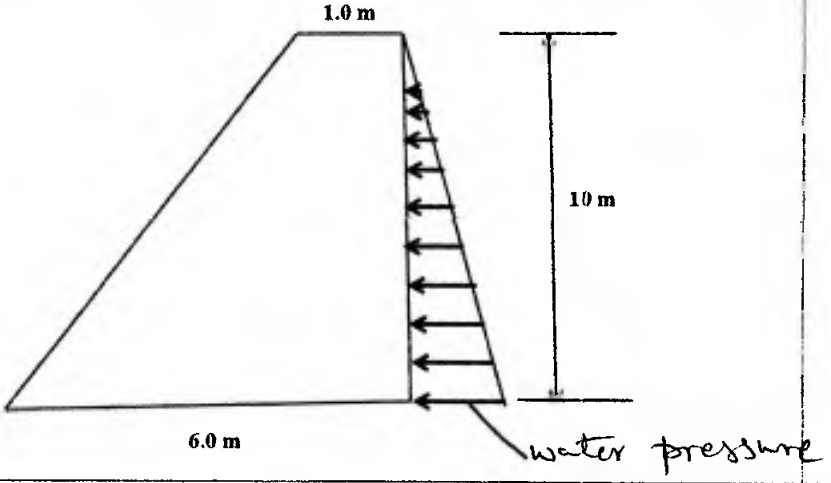
End Semester Examinations: May 2019

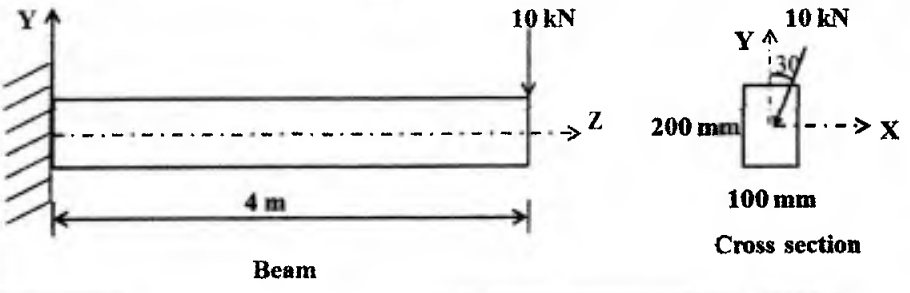
Program: B.Tech. in Civil Engineering **Duration: 3 Hours**

Course Code: PC-BTC402 **Maximum Points: 100**

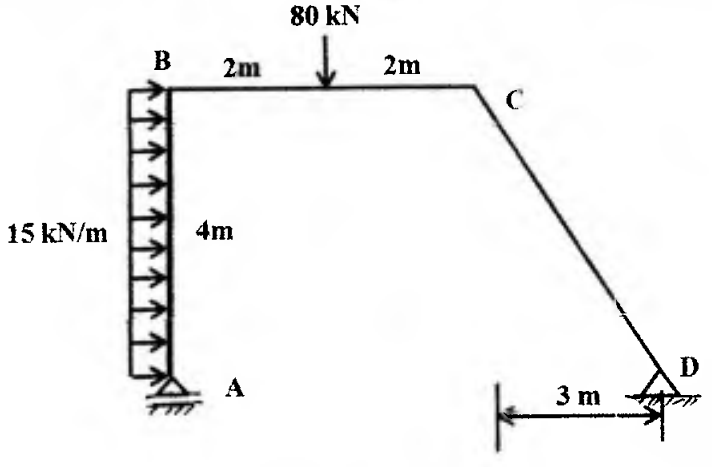
Course Name: Structural Mechanics **Semester: IV**

1. Attempt any FIVE questions out of SEVEN questions.
2. **Answers to all sub questions should be grouped together.**
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary and state the same clearly.

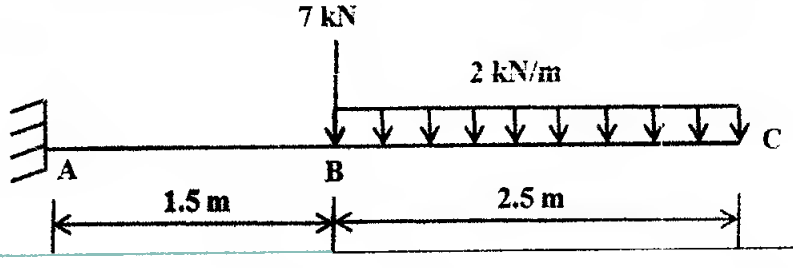
Q.No.	Questions	Points	CO	BL	PI
Q.1(a)	A 10 m high masonry dam of trapezoidal cross section ABCD has the top and bottom widths of 1m and 6m respectively as shown in figure below. The dam retains water on its vertical face to a depth of 10 m. Determine the maximum and minimum stresses developed at the base of the dam. The unit weight of masonry is 22 kN/m^3 and that of water is 10 kN/m^3.	10	1	4	1.1.1 1.3.1 2.4.1
					
Q.1(b)	A cantilever beam of span 4 m, is subjected to a point load of 10 kN at an angle of 30° with Y axis as shown in figure below. The cross section of the beam is a rectangle of width 100 mm and depth 200 mm. Find the maximum bending moment and state its location. Show this moment vector in the cross section. Find the location of the neutral axis and show it in the cross section. Find the maximum and minimum bending stresses and state their location in the cross section.	10	1	4	1.1.1 1.3.1 2.4.1



Q.2(a)	State and explain Bette's theorem.	05	2	2	1.3.1
Q.2(b)	For the frame loaded as shown in figure below a) Find the support reactions b) Draw AFD, SFD & BMD	15	2	3,4	1.3.1 2.1.3



Q.3(a)	Find the slope at C and vertical deflection at B for the beam supported and loaded as shown in figure below. Use moment area method only.	10	3	3,4	1.3.1 2.1.3



Q.3(b)	Find the slope and vertical deflection at C for the beam supported and loaded as shown in figure below. Use conjugate method only.	10	3	3,4	1.3.1 2.1.3

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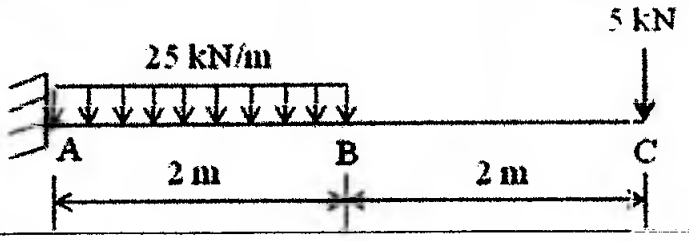
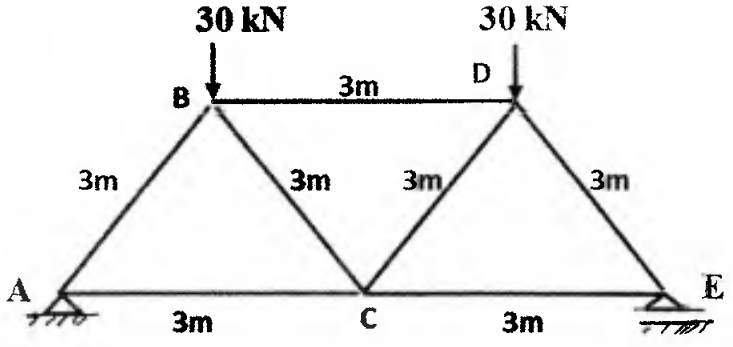
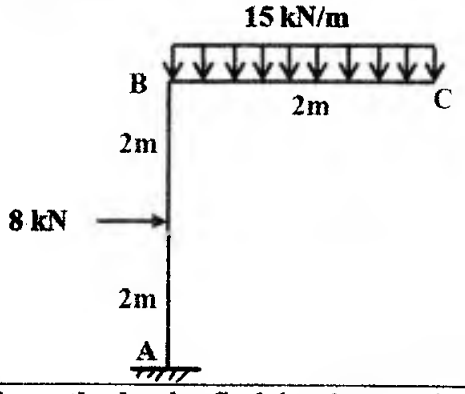
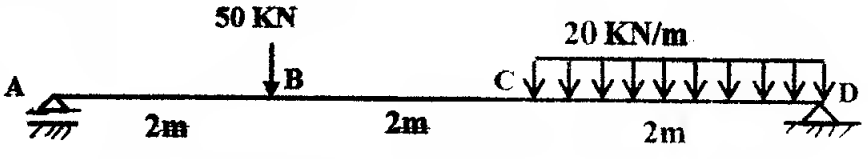
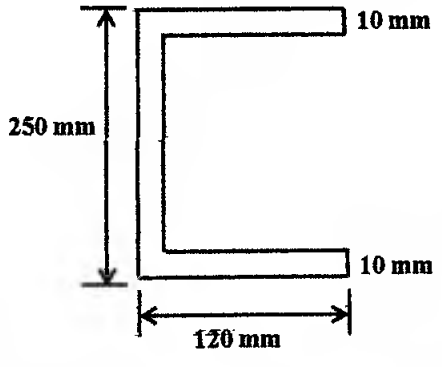
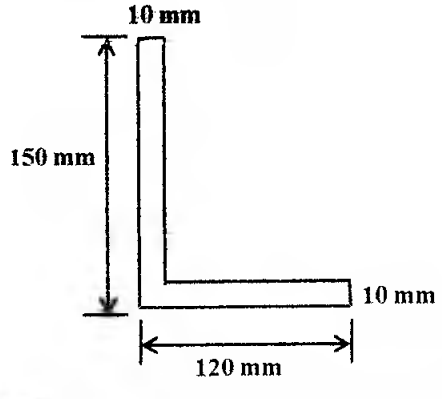
End Semester Examinations: May 2019

					
Q.4(a)	For the pin jointed frame loaded as shown in figure below, find the vertical deflection of joint C.	10	3	3,4	
					
Q.4(b)	Determine the vertical deflection of point C of the rigid jointed frame loaded as shown in figure below.	08	3	3,4	
					
Q.5(a)	Using **Macaulay's method** only, find the slope and vertical deflection at C for the beam supported and loaded as shown in figure below.	10	3	3,4	1.1.1 1.3.1 2.4.1
					
Q.5(b)	A cylindrical shell 2.6 m long, which is closed at the ends has an internal diameter of 0.9 m and a wall thickness of 15 mm. Calculate the circumferential and longitudinal stresses induced and also change in the diameter, length and volume of the shell if it is subjected to an internal	10	4	3,4	1.1.1 1.3.1 2.4.1

	pressure of 1.4 MN/m^2. Take E = 200 GN/m^2, μ= 0.3.				
Q.6(a)	A thin spherical shell 1m in diameter and 1.2 cm wall thickness is filled with a fluid at atmospheric pressure. Find the intensity of internal pressure developed in it if 175 cm^3 more of fluid is pumped into it. Also, calculate the circumferential stress at that pressure and the increase in diameter. Take E = 200 GN/m^2, μ= 0.3.	10	4	3,4	1.1.1 1.3.1 2.4.1
Q.6(b)	Compare the crippling loads given by Euler's and Rankine's formulae for a steel column 3.0 m long with one end fixed and the other end hinged (pinned). The cross section of the column is a symmetrical I section with the following dimensions. Top and bottom Flange width = 220 mm, Top and bottom Flange thickness = 20 mm, Depth of web = 350 mm, Thickness of web = 25 mm. Take E = 2x10^5 N/mm^2, f_c = 350 MPa and Rankine's constant = 1/7000.	10	4	3,4	1.1.1 1.3.1 2.4.1
Q.7(a)	Locate the shear center for the thin walled symmetrical channel section shown in figure below. Thickness of flange and web = 10 mm.	10	4	3,4	1.1.1 1.3.1 2.4.1
					
Q.7(b)	Locate the principal axes and find the principal moments of inertia for the angle section of thickness 10 mm shown in figure below.	10	1	3,4	1.1.1 1.3.1 2.4.1
					

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Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

May 2019

End semester examination

Maximum Points: 100 **Duration: 3 hours**

Class: S.Y.B.Tech **Semester: IV** **Program: CIVIL**

Name of the Course: Probability and Statistics **Course Code : BS-BTC401**

Instructions:

- **Question Number.1 is compulsory.**
- **Attempt any FOUR questions out of remaining SIX questions.**
- **Answers to all sub questions should be grouped together.**
- **Answer to question should be written in detail.**

Q	QUESTIONS	POINTS	CO	BL	PI
1A)	Find the angle between the lines of regression	06	1	1	1.2.1
1B)	The mean height of random sample of 100 individuals from a population is 160.The S.D. of the sample is 10.Would it be reasonable to suppose that the mean of the population is 165?	06	3	2,3,4	2.4.1
1C)	Twelve dice were thrown 4096 times and the number of appearance of "6" each time was noted. NO. OF SUCCESSES: 0 | 1 | 2 | 3 | 4 | 5 | 6 & above FREQUENCY: 447 | 1145 | 1181 | 786 | 380 | 115 | 32 Fit a binomial distribution when the dice are unbiased.	08	2	2,3,4	2.4.3
2A)	In an experiment on pea – breading mendel obtained the following frequencies of seeds. 315 Round and Yellow 101 Wrinkled and Yellow 108 Round and Green 32 Wrinkled and Green According to his theory of heredity the numbers should be in population 9:3:3:1. Is there any evidence to doubt the theory at 5% Los?	06	3	2,4,5	2.4.2
2B)	A manufacturer finds that the average demand per day for the	06	2	3,4,5	2.4.4

	mechanic to repair his new production is 1.5.Over a period of one year the demand per day is distributed as Poisson distribution.He employs two mechanics.On how many days in one year i) both mechanics would be free ii) some demand is refused.				
2C)	An electric bulb manufacturing company produces bulbs having a life time which is normally distributed with mean 800 hours and standard deviation 40 hours. Find i) the probability that a bulb selected at random will have life more than 834 hours. ii) The probability bulb lasts between 778 & 834 hours.	08	2	2,3	2.4.3
3A)	The following data represents the biological values of protein from cow's and buffalo's milk at a certain level. Cow'milk: 1.82, 2.02, 1.88, 1.61, 1.81, 1.54 Buffalo's milk: 2.00, 1.83, 1.86, 2.03, 2.19, 1.88 Examine if the average values of protein in the two samples in the two samples significantly differ.LOS 5%.	06	3	4,5,6	2.4.2
3B)	Two random samples gave the following data: Sample no. 1: Size 8, Mean 9.6, Variance 1.2 Sample no. 2: Size 11, Mean 16.5, Variance 2.5 Can we conclude that the two samples have been drawn from the same normal population?LOS 5%.	06	3	5,6	2.4.4
3C)	In an industrial complex,the average number of fatal accidents per month is ½.The number of accidents per month is adequately described by a Poisson distribution.What is the probability that 6 months will pass without a fatal accident?	08	2	2,3,4	1.4.1
4A)	In an examination marks obtained by students in mathematics, physics and chemistry are normally distributed with means 51,53 and 46 with standard deviations 15,12,16 respectively. Find the probability of securing total marks (i) 180 or more (ii) 90 or below.	06	2	3,4	2.4.3
4B)	A man buys 100 electric bulbs of each of two well known makes taken at random from stock for testing purpose.He finds that make "A" has a mean life of 1300 hours with a S.D. of 82 hours and make "B" has a mean life of 1248 hours with S.D. of 93 hours.Discuss the significance of these results.	06	3	4,5	1.3.1
4C)	Calculate the correlation coefficient for the following data: X: 9, 8, 7, 6, 5, 4, 3, 2, 1 Y: 15, 16, 14, 13, 11, 12, 10, 8, 9	08	1	2,3	2.4.1
5A)	Fit a Poisson distribution for the following distribution X: 0, 1, 2, 3, 4, 5, Total	06	2	2,3,4	2.4.3

		f	142	156	69	27	5	1	400			
5B)	Two cards are drawn simultaneously from a well – shuffled deck of 52 cards. Compute the variance for the number of aces.									06	1	4,5	2.4.4
5C)	If X & Y are random variables with the same standard deviation σ and zero correlation then show that $U = X\cos\alpha + Y\sin\alpha$ & $V = X\sin\alpha - Y\cos\alpha$ have zero covariance.									08	1	2,3,4	1.1.1
6A)	A crv X has PDF defined as $f(x) = \begin{cases} 0, x \le 2 \\ \frac{2x+3}{18}, 2 \le x \le 4 \\ 0, 4 \le x \end{cases}$. Find mean & variance.									06	2		1.1.1
6B)	From the following data calculate the coefficient of rank correlation between x & y									06	1		2.4.3
	X	32	55	49	60	43	37	43	49	10	20		
	Y	40	30	70	20	30	50	72	60	45	25		
6C)	The mean consumption of food grains among 400 sampled middle class consumers is 380 grams per day per person with a standard deviation of 120 grams.A similar sample survey of 600 working class consumers gave a mean of 410 grams with a standard deviation of 80 grams.Are we justified in saying that the difference between the averages of the two classes is 40?LOS 5%									08	3	3,4	2.4.4
7A)	Two judges X, Y ranked 8 candidates as follows. Find the correlation coefficient.									06	1	2,5	2.4.1
	Candidates	A	B	C	D	E	F	G	H				
	Judge X	5	2	8	1	4	6	3	7				
	Judge Y	4	5	7	3	2	8	1	6				
7B)	A machine is claimed to produce nails of mean length 5 cm and standard deviation of 0.45 cm.A random sample of 100 nails gave 5.1 cm as their average length.Does the performance of the machine justify the claim?LOS 5%									06	3	5,6	2.4.3
7C)	1000 students are graded according to their I.Q. & their economic conditions.Use chi-square test to find out whether there is any association between economic conditions and the level of I.Q.									08	3	4,5	2.4.4

Economic		I.Q.	
Conditions	High	Medium	Low
Rich	160	300	140
Poor	140	100	160

Percentage Points of χ^2 - Distribution

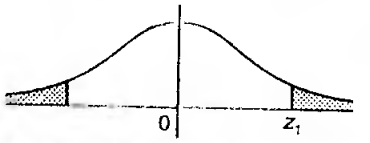
Example

For $\Phi = 10$ d. o. f.

$P(\chi^2 > 15.99) = 0.10$

Φ \ P	0 = .99	0.95	0.50	0.10	0.05	0.02	0.01
1	.000157	.00393	.455	2.706	3.841	5.214	6.635
2	.0201	.103	1.386	4.605	5.991	7.824	9.210
3	.115	.352	2.366	6.251	7.815	9.837	11.341
4	.297	.711	3.357	7.779	9.488	11.668	13.277
5	.554	1.145	4.351	9.236	11.070	13.388	15.086
6	.872	1.635	5.348	10.645	12.592	15.033	16.812
7	1.339	2.167	6.346	12.017	14.067	16.622	18.475
8	1.646	2.733	7.344	13.362	15.507	18.168	20.090
9	2.088	3.325	8.343	14.684	16.919	19.679	21.666
10	2.558	3.940	9.340	15.987	18.307	21.161	23.209
11	3.053	4.575	10.341	17.275	19.675	22.618	24.725
12	3.571	5.226	11.340	18.549	21.026	24.054	26.217
13	4.107	5.892	12.340	19.812	22.362	25.472	27.688
14	4.660	6.571	13.339	21.064	23.685	26.873	29.141
15	4.229	7.261	14.339	22.307	24.996	28.259	30.578
16	5.812	7.962	15.338	23.542	26.296	29.633	32.000
17	6.408	8.672	16.338	24.769	27.587	30.995	33.409
18	7.015	9.390	17.338	25.989	28.869	32.346	34.805
19	7.633	10.117	18.338	27.204	30.144	33.687	36.191
20	8.260	10.851	19.337	28.412	31.410	35.020	37.566
21	8.897	11.591	20.337	29.615	32.671	36.349	38.932
22	9.542	12.338	21.337	30.813	33.924	37.659	40.289
23	10.196	13.091	22.337	32.007	35.172	38.968	41.638
24	10.856	13.848	23.337	32.196	36.415	40.270	42 980
25	11.524	14.611	24.337	34.382	37.652	41.566	44.314
26	12.198	15.379	25.336	35.363	38.885	41.856	45.642
27	12.879	16.151	26.336	36.741	40.113	44.140	46.963
28	13.565	16.928	27.336	37.916	41.337	45.419	48.278
29	14.256	17.708	28.336	39.087	42.557	46.693	49.588
30	14.953	18 493	29.336	40.256	43.773	47.962	50.892

Percentage Points of t - distribution



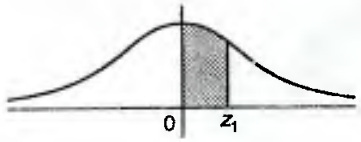
Example

For $\Phi = 10$ d. o. f.

$P(|t| > 1.812) = 0.1$

Φ \ P	0.20	0.10	0.05	0.02	0.01
1	3.078	6.314	12.706	31.812	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.287
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
40	1.303	1.684	2.021	2.423	2.704
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617
∞	1.282	1.645	1.960	2.325	2.576

Area Under Standard Normal Curve



The table gives the area under the standard normal curve from $z = 0$ to $z = z_1$ which is the probability that z will lie between $z = 0$ and $z = z_1$.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.8832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2703	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4415	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4841	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	4957	.4959	.4560	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990