			M	CO	KL

Section-A

			M	CO	KL
1	a.	Test whether the vectors (1,0,1), (1,1,0), (1,1,-1) are linearly dependent or independent?	2	1	1
	b.	Find the rank of the matrix: $A = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$	2	1	1
	c.	What is quartile deviation and coefficient of quartile deviation?	2	2	1
	d.	Define standard deviation.	2	2	1
	e.	A book has 4 misprint per page on an average, what is the probability that a page will open at random will have no misprint on it.	2	3	1
	f.	If $P(A) = \dfrac{1}{6}$, $P(B) = \dfrac{1}{8}$, $P(AUB) = \dfrac{1}{4}$. Find $P(A/B)$ and $P(B/A)$.	2	3	1
	g.	Define confidence interval.	2	4	1
	h.	Define t-distribution.	2	4	1
	i.	The covariance between x and y is 12.5 and the variance of x and y is 16.4 and 13.8. Find the coefficient of correlation between them.	2	5	1
	j.	Define positive correlation and negative correlation.	2	5	1

Section-B:
Unit-I

			M	CO	KL
2	a.	Write notes on vector space.	8	1	2
	b.	Let $L: P_2 \to P_2$ and $L(a + bx + cx^2) = (a+b) + bx + (a+b+c)x^2$. Find the matrix L with respect to the basis $B = (1, x, x^2)$.	8	1	3

OR

			M	CO	KL
3	a.	Show that the set of all 2x2 matrices form a vector space over the operation addition and scalar multiplication.	8	1	2
	b.	Solve using Gauss Elimination Method: $x + y + z = 9$ $2x - 3y + 4z = 13$ $3x + 4y + 5z = 40$	8	1	3

		Write the coefficient matrix and its quadratic form.			
		## Unit-II			

		Compute the mode for the following data:			

	a.	Value of the item	2	3	4	5	6	7	8	9	10	11	12	13	8	2	3
4		Frequency	3	8	10	12	16	14	10	8	17	5	4	1			

Calculate the mean deviation for the following data:

	b.	Sales (in thousands)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	8	2	3
		No. of days	5	6	8	15	17	7	9	3			

OR

5	a.	Fit a straight line of the form $y = a + bx$ to the following data by the method of group averages: x: 1 2 3 4 5 6 7 8 9 10 y: 52.5 58.7 65.0 70.2 75.4 81.1 87.2 95.5 102.2 108.4	8	2	3

Find the Bowley's coefficient of skewness for the following data:

	b.	X	30-40	40-50	50-60	60-70	70-80	80-90	90-100	8	2	3
		F	1	3	11	21	43	32	9			

Unit-III

6	a.	If the diameter X(cm) of certain bolt has the density function $f(x) = \begin{cases} k(x-0.9)(1.1-x), 0.9 < x < 1.1 \\ 0, otherwise \end{cases}$. Find k, μ and σ^2.	8	3	3
	b.	If the probability of producing a defective screw P=0.01. What is the probability that a lot of 100 screws will contain more than 4 defectives?	8	3	3

OR

7	a.	Find the mean and variance of the random variable X, where $f(x)$ is the probability function for the uniform distribution [0,10].	8	3	3
	b.	Five fair coins are tossed simultaneously. Find the probability function of the random variable X=Number of heads and compute the probabilities of obtaining no heads, precisely 1 head, at least 1 head, not more than 4 heads.	8	3	3

Unit-IV

8	a.	Find maximum likelihood estimate for μ and σ in case of normal distribution.	10	4	3
	b.	Find the 99% confidence interval for μ, where c=3.25 for the data:	6	4	3

X	65	65	64	63	65	66	63	64	62	63

OR

9	a.	Find maximum likelihood estimate for θ for the probability function: $$f(x) = \begin{cases} \theta e^{-\theta x}, x \geq 0 \\ 0, otherwise \end{cases}$$	8	4	3
	b.	Determine a 95% confidence interval for the variance using the sample 89,84,87,81,89,86,91,90,78,89,87,89,83,89. Where $C_1 = 5.01$ and $C_2 = 24.74$.	8	4	3

UNIT-V

10	a.	Find the regression lines y on x and x on y for the following data: X: 1 3 4 6 8 9 11 14 Y: 1 2 4 4 5 7 8 9 Also find Y at X=10.	10	5	3
	b.	Find the correlation coefficient for the following data: <table><tr><td>X</td><td>65</td><td>63</td><td>67</td><td>64</td><td>68</td><td>62</td><td>70</td><td>66</td></tr><tr><td>F</td><td>68</td><td>66</td><td>68</td><td>65</td><td>69</td><td>66</td><td>68</td><td>65</td></tr></table>	6	5	3

OR

11	a.	Find the regression lines y on x and x on y for the following data: X: 1 2 3 4 5 6 7 8 9 10 Y: 10 12 16 28 25 36 41 49 40 50	10	5	3
	b.	Find the correlation coefficient for the following data: <table><tr><td>X</td><td>55</td><td>56</td><td>58</td><td>59</td><td>60</td><td>60</td><td>62</td></tr><tr><td>F</td><td>35</td><td>38</td><td>38</td><td>39</td><td>44</td><td>43</td><td>45</td></tr></table>	6	5	3

O P JINDAL UNIVERSITY
I B. Tech. III Semester Regular Examinations
Surveying I
(Offered to CE)

OPJU

| Time: 3 Hrs. | | | Max. Marks: 100 | | | | |

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
		Unit-I (20 marks)			
1	a.	What are the various types of surveying based on instruments used? Detail the instruments used in chain survey and the steps in chain survey?	10	1	III
	b.	Detail the different types of tapes used in surveying? Define the terms 1. Exterior angle 2. Metric chain 3. Included angle 4. Reduced level	10	1	III
		OR			
2	a.	Detail the following terms 1. WCB 2. Quadrantal system 3. Least count in Vernier scale (For various verniers) (with neat diagrams)	10	1	III
	b.	Define the terms 1. BS 2. FS 3. IS 4. FB 5. BB 6. Levelling	10	1	III
		Unit-II			
3	a.	Define Chain survey? Detail the instruments used in chain survey? Detail the correction required in a chain survey?	10	1	III
	b.	A closed traverse has following length and bearing. Calculate the missing values (X and Y)?	10	2	III

Line	AB	BC	CD	DE	EF	FA
Length	240	X?	140	225	160	200
bearing	86	43	310	300	Y?	165

		OR			

			M	CO	KL
4	a.	In a closed traverse calculate the interior angles and included angles? Traverse is in anti-clockwise direction.	10	1	III

Line	AB	BC	CD	DE	EA
FB	60⁰ 30'	122⁰ 0'	46⁰	205⁰ 30'	300⁰

| | b. | A closed traverse has following length and bearing. Calculate the missing values? | 10 | 2 | III |

Line	PQ	QR	RS	ST	TP
Length	X?	280	350	Y?	275
bearing	35	80	165	238	310

Unit-III

5	a.	Following are the bearings of a closed traverse. Find out the correct bearings for all? Line / FB / BB table below	10	3	III

Question 5a table:

Line	FB	BB
AB	142^0 30'	322^0 30'
BC	223^0 15'	44^0 15'
CD	287^0	107^0 45'
DE	12^0 45'	193^0 15
EA	60^0	239^0

	b.	Write down the comparative statements on Bowditch method and Transit method?	10	3	III

OR

6	a.	1. Define the correction due to curvature, correction due to refraction and combined correction with neat diagram? 2. A person is moving on a ship at a height of 12 m from sea level. A light house of 52m just becomes visible for the person moving on ship. If after some time another point at light house which is 10 m below the top of light house just visible then calculate distance travelled by the ship between this instance.	10	2	III
	b.	A closed traverse has following length and bearing. Find out the closing error and correct the traverse for all closing error by **Bowditch method. Crosscheck it with transit method.**	10	3	III

Question 6b table:

line	Length	BB
AB	160	46
BC	190	130
CD	200	220
DE	180	320

Unit-IV

7	a.	The following staff readings were recorded in leveling operations: 1.185, 2.604, 1.925, 2.305, 1.115, 0.864, 1.105, 1.685, 1.215, 1.545 and 0.605 A is the benchmark of reduced level 185.685m. find the RLs of all other points by rise and fall method. First reading was to point A and the instrument was shifted after the reading 2.604, 0864, and 1.215. Verify the result.	10	3	III
	b.	Following readings were taken in a fly levelling using a staff of 4.0 m length. Instrument was shifted after 4th, 9th, 11th and 13th reading. 1st reading was taken on a BM of RL 100 m. Fill the level book and Calculate RL of all points. Data: 2.00, 2.60, 3.20, 3.90, 0.80, 1.40, 2.00, 2.80, 2.10, 3.10, 0.90, 3.00, 1.20, 2.40, 0.80.	10	3	III

OR

8	a.	Readings taken in order during a leveling work are given in Table 1 (Table 1 attached in the last page). Tabulate them suitably and find the reduced level of all the points using height of collimation method. if the RL of the first point A is assumed to be 100.00m	10	2	III
	b.	1. If staff reading is taken on a BM from instrument is 2.4 m R_L of BM is 300 m. BM is near by the instrument and reading is taken from that same instrument at a distance of 2.4 km is 3.56 on a staff at point P. Calculate R_L of point P. 2. Define the correction due to refraction and correction due to curvature?	10	2	III

UNIT-V

9	a.	What is contouring? Define important properties of a contour map with neat sketch? What are the purposes of contouring?	10	3	III
	b.	Detail the term contour interval and horizontal equivalent? What are the methods of contouring?	10	3	III

OR

10	a.	Determine the elevation of a point P. A tacheometer was set up at station A and observations were made to a staff held vertically at P. as a check, the instrument was set up at another point B and observations were taken to staff held at P. RL of the benchmark was 235.455. The instrument constants were 100 and 0.3. Determine the RL of P from the following data recorded.	10	3	III

Instrument at	Staff at	Vertical angle	Hair reading	Reading at BM
A	P	3°45'	2.235, 2.795, 3.355	1.75
B	P	2°30'	0.945, 1.490, 2.035	2.25

	b.	Write down 9 key characteristics of contour? Draw neat contour sketches of following features: i) Pond, ii) Hill, iii) Overhanging cliff.	10	3	III

Table 1. Data of question no 8a.

Staff station	A	B	C	D	E	F	G
BS	0.684		0.864			2.845	
IS		1.246		1.684	0.964		
FS			1.105			1.368	0.748

Course Code: SOE-B-CE302			

O P JINDAL UNIVERSITY
II B. Tech. III Semester Regular Examinations
STRENGTH OF MATERIALS
(Offered to Civil Engineering)

OPJU

UNIVERSITY OF STEEL TECHNOLOGY AND MANAGEMENT

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

Solve all questions from section A
(Solve any two from each unit)

			M	CO	KL
		Section-A(Solve all questions)			
Q.1	a.	Define ductility	2	CO1	KL1
	b.	Express poisons ratio	2	CO1	KL1
	c.	Define principal plane	2	CO2	KL1
	d.	Define angle of obliquity	2	CO2	KL1
	e.	Define shear force and bending moment	2	CO3	KL1
	f.	Draw BMD for simply supported beam carrying a uniformly distributed load of w per unit run over the whole span	2	CO3	KL1
	g.	What is pure bending	2	CO4	KL1
	h.	Write simple bending equation	2	CO4	KL1
	i.	What is kernel of Rectangular section	2	CO5	KL1
	j.	What is middle third rule for retaining walls	2	CO5	KL1
		Section-B: (Solve any two from each unit)			
		Unit-I			
Q.2	a.	Following observation are made during a tensile test on a mild steel specimen 40mm in dia meter and 200mm long. Elongation with 40KN load is 0.305mm. maximum load=280 KN and length of specimen at fracture=250mm. Calculate a) young's modulus. b) ultimate stress c) percentage of elongation	8	CO1	KL2
	b.	Steel rod os 900 mm long; its two ends are 40mm and 30mm in dia and the length of each rod is 200mm. the middle portion of the bar is 15mm in dia and 500mm long. If bar is subjected to an axial tensile load of 15 KN. Find its total extension. Take E=200 GN/sq.m.	8	CO1	KL2
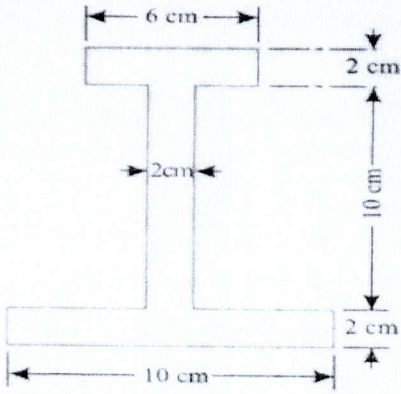
	c.	A bar of steel is 50 mm x 50 mm in section and 190 mm long. It is subjected to a tensile load of 250 kN along the longitudinal axis and tensile load of 700 kN and 600 kN on the lateral faces. Find the change in the dimensions of the bar and the change in volume. Take E= 200 GN/m^2 and poisson's ratio =0.3	8	CO1	KL2
Unit-II
Q.3	a.	A short metallic column of 500 Sqmm cross sectional area carries an axial compressive load of 100 KN . For a plane inclined at 60° with the direction of load , Calculate i) Normal stress, ii) Tangential stress, iii) Resultant stress, iv) Maximum shear stress and v) Obliquity of the resultant stress.	8	CO2	KL2
	b.	The principal stresses at a point across two perpendicular planes are 75 MN/Sqm(T) and 35 MN/Sqm(T). using analytical method find the normal, tangential and resultant stresses and its obliquity on a plane at 20 degree with major principal plane.	8	CO2	KL2
	c	A point is subjected to perpendicular planes are 50 MN/Sqm and 30 MN/Sqm both tensile. Using graphical method find the normal, tangential and resultant stresses and its obliquity on a plane at 30 degree with major principal plane.	8	CO2	KL2
Unit-III
Q.4	a.	A cantilever beam of length 2 m caries uniformly distributed load of 1.5 KN/m run over the whole length and point load of 2 KN at a 0.5 m from the free end. Draw SFD and BMD.	8	CO3	KL2
	b.	A Simply supported beam of length 6 m caries uniformly distributed load of 2 KN/m run over the whole length and point load of 2 KN at a 2 m from the left end and point load of 3 KN at a 2 m from the right end. Draw SFD and BMD.	8	CO3	KL2
	c	A Simply supported beam of length 10 m caries uniformly distributed load of 6 KN/m over middle 5m length and point load of 50 KN at a 2.5 m from the left end and point load of 40 KN at a 2.5 m from the right end. Draw SFD and BMD.	8	CO3	KL2
Unit-IV
Q.5	a.	A rectangular beam 200mm deep and 300mm wide is simply supported over a span of 8m. what uniformly distributed load beam may carry, if the bending stress is not exceed 120 N/sqmm.	8	CO4	KL2

	b.	A beam I section shown in figure is subjected to a bending moment of 10 KNm at its neutral axis. Find the maximum stresse induced in the beam. 	8	CO4	KL2
	c.	A beam I symmetrical section is subjected to a bending moment of 15 KNm at its neutral axis. Find the maximum and minimum stresse induced in the beam. Dimensions of the section are: width of flange=200 mm, thickness of flange=20 mm, thickness of web=10 mm, height of web=360 mm.	8	CO4	KL3
	d	A wooden beam 100 mm wide and 150 mm deep is simply supported over a span of 4 m. if shear force at a section is 4500N. Find the shear stress at a distance 25mm above the neutral axis.	8	CO4	KL2
		UNIT-V			
Q.6	a.	A rectangular column of width 200 mm and thickness 150 mm carries point load of 250KN at an eccentricity of 15 mm. determine the maximum and minimum stresses on the section.	8	CO5	KL2
	b.	A short rectangular column of width 300 mm and thickness 400 mm carries point load of 360KN at an eccentricity of 75 mm from y axis and 100mm from x axis. Load is in first quadrant. determine the maximum and minimum stresses on the section.	8	CO5	KL3
	a.	Explain middle third rule for rectangular section and middle quarter rule for circular section.	8	CO5	KL1

	Course Code: 01UG010

O P JINDAL UNIVERSITY
B. Tech. III Semester Regular Examinations
INTRODUCTION TO PYTHON
(Offered to CE)

OPJU

UNIVERSITY OF STEEL TECHNOLOGY AND MANAGEMENT

Time: 3 Hrs.			Max. Marks: 100		

Answer any one question from each unit
All questions carry equal marks

			M	CO	KL
		Section-A			
1	a.	Explain the //, %, and ** operators in Python.	2	1	2
	b.	What do you mean by args and kwargs in Python?	2	1	1
	c.	What is slicing in Python?	2	1	1
	d.	Define Encapsulation in Python?	2	2	1
	e.	What is a docstring?	2	2	1
	f.	What is lambda function?	2	1	1
	g.	What is the difference between deep and shallow copy?	2	2	1
	h.	What do you understand by reindexing in pandas?	2	1	1
	i.	What is the difference between NumPy and SciPy?	2	1	1
	j.	What are modules and packages in Python?	2	2	1
		Section-B:			
		Unit-I			
2	a.	What is the difference between Compiler and Interpreter? Explain in detail.	8	1	1
	b.	What are the common built-in data types in Python? Explain with Examples.	8	2	1
		OR			
3	a.	What are Operators in Python. Explain with Examples.	12	2	5
	b.	Explain the salient features of Python?	4	1	5
		Unit-II			

4	a.	You have to build a "Number Guessing Game," in which a winning number is set to some integer value. The Program should take input from the user, and if the entered number is less than the winning number, a message should display that the number is smaller and vice versa.
		Instructions:
		    1. The number of guesses should be limited, i.e (5).
		    2. Print the number of guesses left.
		    3. Print the number of guesses he took to win the game.
		    4. "Game Over" message should display if the number of guesses becomes equal to 0.
			12	3	3

	b.	Write a program in Python to check if a number is prime?	4	2	3
		OR			

	a.	What is the difference between List and Array? Explain in detail.	8	1	1
5	b.	Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged.	8	2	6

Unit-III

6	a.	Create a dictionary using Civil Engineering terms and take input from the user and return the meaning of the word from the dictionary? (Minimum five words)	8	3	3
	b.	What are global and local variables? Explain with Examples.	8		1

OR

7	a.	Write a program to produce Fibonacci series in Python.	10	2	6
	b.	Write a program in Python to produce Star triangle.	6	1	6

Unit-IV

8	a.	Write a Pandas program to convert a dictionary using Civil Engineering terms to a Pandas series.	8	3	2
	b.	What is Matplotlib? Write a program to draw two points in the diagram, one at position (1, 3) and one in position (8, 10) using matplotlib function.	8	2	5

OR

9	a.	What are Python libraries? Explain any five in detail.	10	2	1
	b.	Write a program to calculate percentiles using NumPy?	6	2	3

UNIT-V

10	a.	How to Find Mean Mode and Median in Python for Data Science. Explain with an example.	12	2	2
	b.	What is Polynomial Regression? Explain with an example.	4	1	1

OR

11	a.	How the Python language can be useful for Civil Engineering? Explain in detail at what areas it can be implemented.	8	3	5
	b.	How does a Non-Linear regression analysis differ from Linear regression analysis?	8	3	2

O P JINDAL UNIVERSITY

B. Tech. III Semester Regular Examinations, January-2023

SUBJECT-FLUID MECHANICS

(Offered to **CIVIL ENGINEERING**)

OPJU
UNIVERSITY OF STEEL TECHNOLOGY AND MANAGEMENT

Time: 3 Hrs.			Max. Marks: 100		
		Answer any one question from each unit of section-B			
		Section-A is compulsory			
			M	**CO**	**KL**
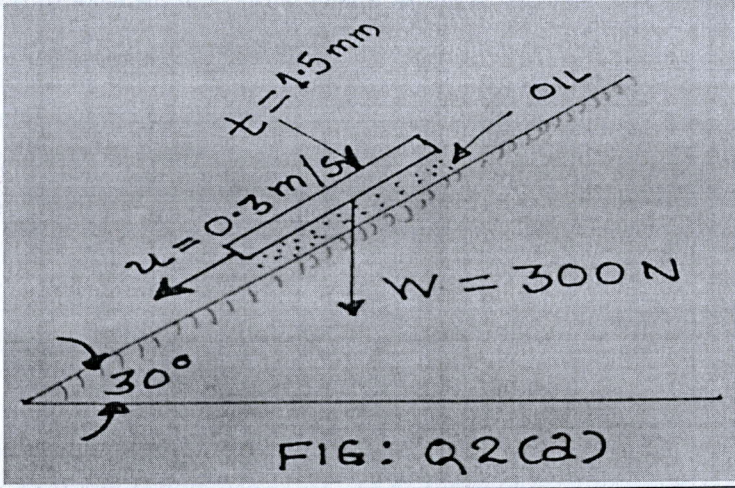
Section-A

1	a.	Define specific gravity and specific weight.	2	1	1
	b.	Define Metacenter and Metacentric height.	2	1	2
	c.	Define velocity potential function and Stream function.	2	2	1
	d.	Differentiate Gradually Varied flow and Rapidly Varied flow.	2	2	2
	e.	What are the utilization of Venturi meter and Orifice Meter.	2	3	1
	f.	Write down the forces which are present in flowing fluid.	2	3	1
	g.	What is meant by Turbine & Pump.	2	4	1
	h.	Define Impulse and Reaction Turbine.	2	4	2
	i.	State Buckingham's π-theorem.	2	5	2
	j.	Write down the formula of Weber's Number & Euler's Number.	2	5	3

Section-B:
Unit-I

2	a.	State Newton's law of viscosity. Calculate the dynamic viscosity of oil which is used for lubrication between a square plate of size of 0.8×0.8 and an angle of inclination and other data shown in fig. FIG: Q2(a)	8	1	3
	b.	State Pascal's law. Derive an Expression for Hydrostatic law.	8	1	2
		OR			
3	a.	Determine the total pressure on a circular plate of diameter 1.5 m which is	8	1	3

		placed vertically in water in such a way that the plate is 3m below the free surface of water. Find the position of center of pressure also.			
	b.	Find the volume of the water displaced and position of Centre of buoyancy for a wooden block of width 2.5m and depth 1.5 m, when it floats horizontally in water. The density of wooden block is 650 kg/m^3 and its length 6.0m.	8	1	3

Unit-II

4	a.	Derive an Expression of continuity equation in three dimensions	12	2	4
	b.	The Diameter of pipe at section 1&2 are 10cm and 15cm respectively. Find the discharge through pipe if the velocity at section 1 is 5m/s.	4	2	3

OR

5	a.	Find the head loss due to friction of pipe of pipe of diameter 300mm and length of 50m through which water is flowing at a velocity of 3m/s by a) Darcy Formula and b) Chezy's Formula. Take Kinematic viscosity of water is 0.01 stokes and Chezy's constant C=60.	8	2	3,4
	b.	A flow of 1000 liters per second flows down in a rectangular channel of width 600mm and having adjustable bottom slope. If Chezy's constant C is 56 , find the bottom slope necessary flow with a depth of flow of 300mm. Also find the conveyance K of the flume.	8	2	3

Unit-III

6	a.	State Bernoulli's theorem. Derive its expression.	16	3	2,4
	b.	--	0		

OR

7	a.	A venturi meter is to be fitted in a pipe 0.25m diameter where the pressure head is 7.6m of flowing liquid and the maximum flow is 8.1m^3per minute. Find the least diameter of the throat to ensure that the pressure head does not become negative. Take the value of co-efficient of discharge as 0.96.	8	3	3
	b.	An orifice meter with orifice diameter 15cm is inserted in a pipe of 30cm diameter. the pressure difference measured by a mercury oil differential manometer on two side of the orifice meter gives a reading of 50cm of mercury. Find the rate of flow of oil of sp. gravity 0.9 when the co-efficient of discharge of orifice meter =0.64.	8	3	3

Unit-IV

8	a.	Write down the efficiencies of turbine. Explain each in brief.	6	4	1,2
	b.	A Pelton wheel is to be designed for the following specifications: Shaft Power = 11772kW, Head =380m, Speed=75r.p.m.; overall efficiency =86%; Jet diameter is not to exceed one-sixth of the wheel diameter. Determine: i) Wheel diameter. ii) Number of jets iii) Diameter of jet.	10	4	3

OR

9	a.	Draw and discuss the main parts of a centrifugal pump.	10	4	6

	b.	A centrifugal pump is to discharge 0.118 m^3/s at a speed of 1450r.p.m. against a head of 25m.The impeller diameter is 250mm, its width at outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.	6	4	3

UNIT-V

	a.	Write down any three flow and fluid properties with their dimensions.	4	5	1
10	b.	The pressure difference Δp in a pipe of diameter D and length l due to turbulent flow depends on the velocity Viscosity μ, density ρ and roughness k. Using Buckingham's π-theorem, obtain an expression for Δp.	12	5	3,4

OR

11	a.	Water is flowing through a pipe of diameter of 30cm at a velocity of 4m/s. Find the velocity of oil flowing in another pipe of diameter 10cm, if the condition of dynamic similarity is satisfied between the two pipes. The viscosity of water and oil is given as 0.01 poise and 0.025 poise the sp. gravity pf oil=0.8.	8	5	3,4
	b.	A 1:64 model is constructed of an open channel in concrete which has Manning's N=0.014. Find the value of N for the model.	8	5	3,4

		Course Code: SOE-B-CE305			

O P JINDAL UNIVERSITY
B. Tech. III Semester Regular Examinations
Disaster Management (Online)
(Offered to CE, ME, EE)

Time: 02 Hrs.   **Max. Marks: 50**

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
Unit-I (10 marks)					
1	a.	Define the term 'Disaster'?	2	1	I
	b.	Summarize the various types of floods?	8	1	II
OR					
2	a.	Summarize the various types of droughts?	5	1	II
	b.	What are the various causes of forest fires?	5	1	I
Unit-II (10 marks)					
3	a.	Write down the process of EIA?	6	2	II
	b.	What are the shortcomings of EIA?	4	2	II
OR					
4	a.	What are the major elements of land-use planning?	4	2	I
	b.	Write a short note on "Traditional Disaster Resistant Construction Techniques"?	6	4	II
Unit-III (10 marks)					
5	a.	Write down the methods to mitigate the impact of the Tsunami?	5	3	II
	b.	Briefly illustrate various methods to mitigate the impact of cyclones?	5	3	II
OR					
6	a.	Briefly describe various methods to mitigate the damage due to Earthquake?	5	3	II
	b.	What are the various causes of Epidemics?	5	3	I
Unit-IV (10 marks)					
7	a.	Draw Disaster management cycle and briefly describe each term?	10	4	II
OR					
8	a.	Summarize the phases, focus, objectives and distinctive features of Community Based Disaster Management (CBDM)?	10	4	II
UNIT-V (10 marks)					
9	a.	What is NDRF and its role in case of disasters?	5	5	I
	b.	What are the other activities beside search and rescue operations undertaken during emergency situation in which NDRF is engaged?	5	5	I
OR					
10	a.	What are the immediate and long-term response of (i) Cyclone & (ii) Drought?	10	5	I

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Course Code: SOE-B-CE309

O P JINDAL UNIVERSITY
II B. Tech. III Semester Regular Examinations
INTRODUCTION TO ENGINEERING SEISMOLOGY (NPTEL)
(Offered to Civil Engineering)
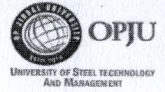
OPJU
UNIVERSITY OF STEEL TECHNOLOGY AND MANAGEMENT

Time: 2 Hrs.

Answer any one question from each unit
All questions carry equal marks

Max. Marks: 50

			M	CO	KL
		Section-A			
1	a.	What is earthquake and list the major 5 earthquake in India?	3	1	1
	b.	Define P and L wave?	3	1	1
	c.	Define liquefication of soil?	3	1	1
	d.	What is focus of earthquake and epicenter (explain with diagram)?	3	1	1
	e.	Define fault, elastic rebound theory, wave propagation?	3	1	1
	f.	How seismic waves are produced?	3	1	1
	g.	What do you mean by active and in active faults?	3	1	1
	h.	Define focal depth, foreshocks, frequency?	3	1	1
	i.	What is inter-plate and intraplate earthquake?	3	1	1
	j.	Write down major plates and minor plates of earthquake?	3	1	1
		Section-B:			
2	a.	Enlist the Major Historic Earthquakes in the world?	5	1	4
	b.	Explain elastic rebound theory?	5	1	2
		OR			
3	a.	Enlist Causes of Earthquakes: Types of Plate Boundaries?	5	1	4
	b.	What are plate tectonics?	5	1	1
		Section-C			
4	a.	Explain major Strike Slip Faults in the world?	5	1	2
	b.	Enlist down types of all Earthquake?	5	1	1
		OR			
5	a.	Why don't magnitude scales agree?	5	1	1
	b.	Write down types of faults and their earthquake mechanism?	5	1	1

	Course Code: SOE-B-CSE303

O P JINDAL UNIVERSITY
B. Tech. III Semester Regular Examinations
OPERATING SYSTEM
(Offered to CE, ECE EEE & ME)

Time: 3 Hrs.   Max. Marks: 100

Answer any one question from each unit

All questions carry equal marks

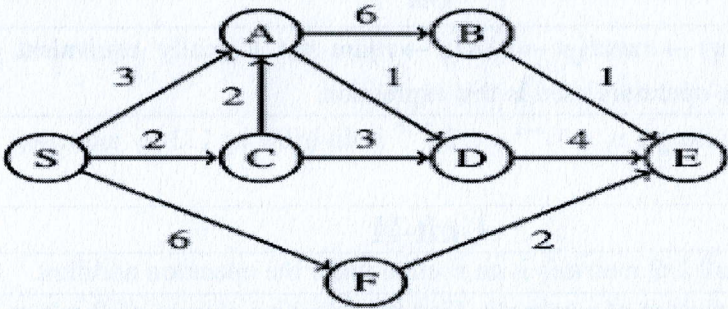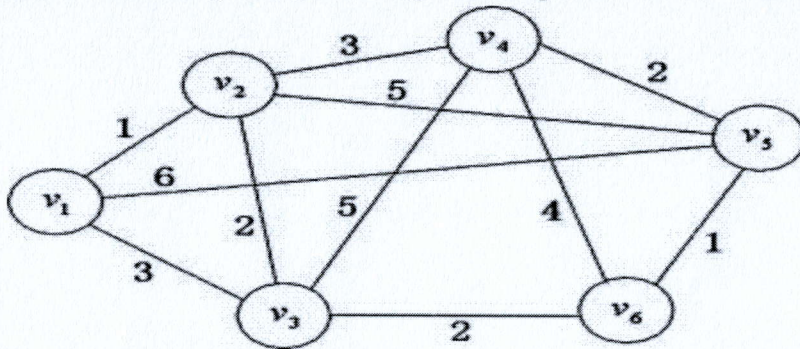|			M	CO	KL
		Unit-I (20 marks)			
1	a.	Define Operating Systems and discuss its role from different perspectives.	10	CO1	KL1
	b.	Write short note on CPU scheduling criteria.	10	CO2	KL3
		OR			
2	a.	List out different services of Operating Systems and explain each service.	10	CO1	KL1
	b.	Explain different types of CPU Schedulers. i) Preemptive and non-preemptive scheduling ii) I/O bound and CPU bound iii) Scheduler and dispatcher	10	CO3	KL2
		Unit-II			
3	a.	Distinguish among following terminologies i) Multiprogramming systems ii) Multitasking Systems iii) Multiprocessor systems.	10	CO2	KL1
	b.	What is the difference between a preemptive and non-preemptive scheduling algorithm? Explain FCFS scheduling algorithm. Find the average turnaround time and average waiting time for the processes given in the table below. Process CPU burst time (in ms) P1: 24, P2: 3, P3: 3.	10	CO3	KL3
		OR			
4	a.	What is distributed operating system? What are the advantages of distributed operating system?	10	CO4	KL3
	b.	Explain the concept of 'process'. also describe the contents of a process control block (PCB).	10	CO3	KL2
		Unit-III			
5	a.	What are system calls? Explain different categories of system calls with example?	10	CO1	KL3
	b.	Describe necessary conditions for a deadlock situation to arise.	10	CO2	KL2
		OR			
6	a.	Explain the distinguishing features of i). Real time system ii) Multiprocessor system.	10	CO4	KL2
	b.	Explain the methods for deadlock prevention.	10	CO2	KL2
		Unit-IV			
7	a.	What is operating system? What are functions of operating system?	10	CO3	KL1
	b.	What is deadlock? Explain the necessary conditions for its occurrence.	10	CO2	KL1
		OR			
8	a.	What do you mean by PCB? Where is it used? What are its contents?	10	CO1	KL1
	b.	What is fragmentation? Explain its types and disadvantages	10	CO1	KL1
		UNIT-V			
9	a.	What is a process? Draw and explain process state diagram.	10	CO3	KL1
	b.	Differentiate between the following a) Paging and Segmentation b) Page table and segment table.	10	CO3	KL2
		OR			
10	a.	Explain three requirements that a solution to critical–section problem must satisfy.	10	CO4	KL2
	b.	Explain paging scheme of memory management. What hardware support is needed for its implementation?	10	CO1	KL2

O P JINDAL UNIVERSITY
B. Tech. III Semester Regular Examinations
Discrete Mathematics

Branch: CSE	Program Code : 01UG020
Time: 3 Hrs.	Max. Marks: 100

Section A : All Questions are compulsory
Section B : Answer any one question from each unit. All questions carry equal marks

			M	CO	KL

Section-A

			M	CO	KL
1	a.	Show that sum of two even integers is even.	2	1	1
	b.	Show that $\sqrt{2}$ is an irrational number.	2	1	1
	c.	Define composition of a function.	2	2	1
	d.	Define domain, co-domain and range of a function.	2	2	1
	e.	Suppose that the number of bacteria in a container triples every hour. Set up a recurrence relation for the number of bacteria after n hours have elapsed.	2	3	1
	f.	Find the generating function for the finite sequence 1,4,16,64,256.	2	3	1
	g.	Among 500 how many people born on the same month?	2	4	1
	h.	Write the formula for $|A \cup B \cup C \cup D|$	2	4	1
	i.	Define handshaking theorem.	2	5	1
	j.	What is shortest path problem?	2	5	1

Section-B:
Unit-I

			M	CO	KL
2	a.	Define Tautology with suitable example and show that $(p \wedge q) \wedge (\neg p \vee r) \rightarrow (q \vee r)$ is a tautology.	8	1	3
	b.	By the method of induction, prove that for $n \geq 1$ $1^2 + 3^2 + 5^2 + \dots\dots\dots + (2n-1)^2 = \dfrac{n(2n-1)(2n+1)}{3}$.	8	1	3

OR

			M	CO	KL
3	a.	Show that $(p \vee q) \rightarrow r \ and \ (p \rightarrow r) \wedge (q \rightarrow r)$ are not logically equivalent. Also define all the operators used in this expression.	8	1	3
	b.	Show that for any integer n, $(11)^{n+2} + (12)^{2n+1}$ is divisible by 133 by induction method.	8	1	3

Unit-II

			M	CO	KL
4	a.	Show that set of all 2x2 matrices is an abelian under the operation addition.	8	2	3
	b.	Define transitive closure of a relation. Find the transitive closure of R where A={a,b,c,d}, $R: A \rightarrow A$ and $R = \{(a,a),(a,b),(a,d),(b,c),(c,a),(c,d)\}$.	8	2	3

		OR			
5	a.	Write notes on semi group, monoid and group.	8	2	2
	b.	Draw the Hasse diagram for A={1,2,3,4,6,8,12}, $R: A \to A$ where $(a,b)\, \varepsilon\, R \Leftrightarrow a/b$.	8	2	3

Unit-III

6	a.	Solve $a_n - 4a_{n-1} + 4a_{n-2} = n + 2^n$.	8	3	3
	b.	Solve $a_n - 7a_{n-2} - 6a_{n-3} = 0$ with $a_0 = 9, a_1 = 10, a_2 = 32$.	8	3	3
		OR			
7	a.	Solve $a_n - 2a_{n-1} - a_{n-2} + 2a_{n-3} = 0$ with $a_0 = 3, a_1 = 6, a_2 = 0$.	8	3	3
	b.	Solve $a_n + 5a_{n-1} + 6a_{n-2} = 3n^2 - 2n + 1$.	8	3	3

Unit-IV

8	a.	Explain pigeonhole principle. What is the minimum number of students in a class to be sure that at least five will receive the same grade if there are four possible grader A,B,C and D.	8	4	3
	b.	Define Inclusion and Exclusion principle. Find how many integers from 1 to 500 are divisible by 3 or by 5 or by 11.	8	4	3
		OR			
9	a.	How many permutation can be made out of the letters of the word 'COMPUTER'? How many of these begin with C, begin with R, begin with C and end with R and C & R always together?	8	4	3
	b.	Find the number of positive integers ≤ 500 which are (i) divisible by 5 or 7 but not by 3 (ii) divisible by 3 or by 5 or by 7 (iii) not divisible by 3 nor by 5 nor by 7.	8	4	3

UNIT-V

10	a.	Define spanning tree, minimal spanning tree and Write the Prim's algorithm to determine the minimal spanning tree.	8	5	2
	b.	Find the shortest path from S to E using Dijkstra's algorithm for the following weighted graph:	8	5	3
		OR			

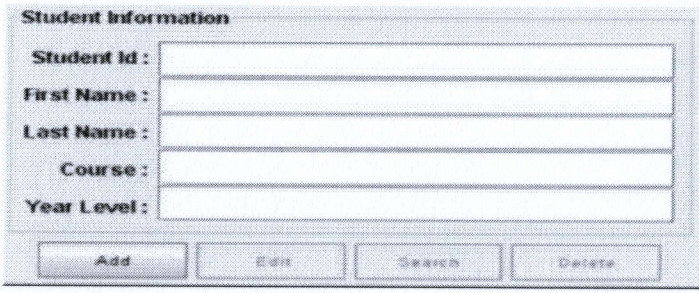| 11	a.	Write the Dijkstra's algorithm to determine the shortest path in a weighted graph.	8	5	2
	b.	Find the minimal spanning tree using Prim's algorithm for the following graph:	8	5	3

O P JINDAL UNIVERSITY
B. Tech. III Semester Regular Examinations
Data Structure & Algorithms
Program Code: 01UG020

Time: 3 Hrs.	Max. Marks: 100

Answer any one question from each unit

All questions carry equal marks.

			M	CO	KL
		Section-A			
1	a.	Write down the types of data structure.	2	CO1	K1
	b.	Define stack data structure.	2	CO1	K1
	c.	What are the features of an efficient algorithm?	2	CO1	K1
	d.	List down any four applications of data structures?	2	CO2	K1
	e.	Compare linear and nonlinear data structures.	2	CO3	K1
	f.	Explain the criterion of algorithm analysis.	2	CO3	K1
	g.	How is an array different from linked list?	2	CO1	K1
	h.	What is the common operation that can be performed on data structure?	2	CO4	K1
	i.	What is queue and what are different application of it.	2	CO4	K1
	j.	How graph and tree are interrelated.	2	CO5	K1
		Section-B: **Unit-I**			
2	a.	Explain the insertion sort algorithm and discuss its characteristics.	8	CO1	K3
	b.	What is stack? Write algorithm for performing basic operations on stack, if its implemented using array.	8	CO1	K3
		OR			
3	a.	Write algorithm to convert infix into postfix expression. Consider expression below to convert into postfix. 2*9-C*(8/E*1-6)*4-K	8	CO1	K3
	b.	How to represent Queue using array. Write algorithm for enque and deque operation.	8	CO1	K3
		Unit-II			
4	a.	Explain double ended queue with help of example.	8	CO2	K3
	b.	What is stack? Write algorithm for performing basic operations on stack, if its implemented using array.	8	CO2	K3
		OR			
5	a.	Suppose the following list of letters is inserted in order into an empty binary search tree : J, R, D, G, T, E, M, H, P, A, F, Q (i) Find the final Tree T. (ii) Find the preorder, inorder and post order traversal of T.	8	CO5	K3
	b.	What is linked list? How is it represented in memory? Briefly explain header linked list.	8	CO2	K3

		Unit-III			
6	a.	Write down the algorithm for insertion of an element inside the linked list.	8	CO3	K3
	b.	Explain sequential and linked representation of binary tree with help of example.	8	CO3	K3
		OR			
7	a.	Explain and implement a single linked list with an example.	8	CO3	K3
	b.	What is a priority queue? Implement using a linked list.	8	CO3	K2, K3
		Unit-IV			
8	a.	What is a spanning tree? Explain how minimal spanning trees are constructed with an example.	8	CO4	K2
	b.	What is binary search tree. Construct the tree using numbers below and perform given operation. { 59, 64, 9, 20, 50, 22, 31, 8, 17, 0, 36, 21,15} Perform: Delete 22, Delete 15, Insert 50, Insert 12, delete 8.	8	CO4	K3
		OR			
9	a.	Write merge sort algorithm properly. Perform analysis of merge sort for worst and best case.	8	CO4	K3
	b.	Write down the bubble sort algorithm and explain.	8	CO4	K3
		UNIT-V			
10	a.	Explain in details tree traversal techniques.	8	CO5	K3
	b.	Write down the traversal techniques of graph with example.	8	CO5	K3
		OR			
11	a.	Write down the algorithm with example for tree traversal.	8	CO5	K3
	b.	Write an algorithm for DFS graph traversal.	8	CO5	K3

		Course Code: SOE-B-CSE-21-303			
		O P JINDAL UNIVERSITY		OPJU	
		B. Tech. III Semester Regular Examinations			
		Object Oriented Analysis and Design using JAVA			
		Computer Science and Engineering			
		Time: 3 Hrs.			
		Max. Marks: 100			
		Answer any one question from each unit			
		All questions carry equal marks			
			M	CO	KL
		Section-A			
1	a.	What is a private constructor?	2	1	1
	b.	What will happen when a constructor is declared as protected?	2	2	1
	c.	What are Access modifiers in java?	2	2	1
	d.	How package plays an important role in access modification?	2	4	1
	e.	What is deadlock?	2	3	1
	f.	What is an event in java?	2	5	1
	g.	Explain throws in exception handling?	2	3	1
	h.	Will the program run if we write static public void main ()? Explain your answer.	2	1	1
	i.	What is Object Cloning?	2	4	1
	j.	Define Wrapper Classes in Java	2	5	1
		Section-B: Unit-I			
2	a.	Explain the importance of package with access specifiers?	8	1	3
	b.	Why is Java a platform independent language? What are the pros and cons of compiled-interpreted languages?	8	1	3
		OR			
3	a.	What are the differences between program and process?	8	1	3

	b.	Explain any two from the below:
		    1. Bitwise operators
		    2. Relational Operators
		3. Increment and Decrement Operators
			8	1	3

Unit-II
4	a.	Explain inheritance with their different categories?	8	2	3
	b.	Write a suitable program in java to extend one super class and implement two interfaces.	8	2	3
OR
5	a.	Explain importance of abstract class with real life example?	8	2	3
	b.	Can we use constructor overloading in inheritance? Explain your answer with justification.	8	2	3
Unit-III
6	a.	Write a multi-threading program called MinValue that finds minimum value in the array of 1000 numbers using 4 threads.	8	3	3
	b.	Explain the need of exception handling in Java? Write a program to handle user defined exception "Marks out of bound". The exception is fired if marks >100.	8	3	3
OR
7	a.	Write program for reading a word from the user and prints the number of occurrences of each letter in the word. Enter the phrase that is having more than one word length. It should print ArrayIndexOutofBoundsException.	8	3	3
	b.	Why synchronization is necessary in implementing multithreaded application. Write simple java program to demonstrate the importance of synchronization.	8	3	3
Unit-IV
8	a.	Write program that creates a file named Student_Info.txt, write paragraph about yourself. Create another file named Copy_Student_Info.txt and copy the content of Student_Info.txt into it. Use I/O reader/writer classes for performing the task.	8	4	3
	b.	Differentiate between execute query and execute update in	8	4	3

		JDBC.			
OR				
9	a.	Explain the importance of Stream classes? Write a program to copy content of file "employee.txt" to "Person.txt" using byte-oriented stream class.	8	4	3
	b.	With necessary diagram and java program, explain the process of JDBC.	8	4	3
UNIT-V				
10	a.	What the different layouts available in JAVA? Explain each in brief	8	4	3
	b.	Write program to connect created GUI in Que 11(b) to MySQL and insert data in the database.	8	4	3
OR				
11	a.	Explain five component of SWING class?	8	4	3
	b.	Write program for designing following GUI using AWT and SWING classes. Student Information Student Id : First Name : Last Name : Course : Year Level : Add Edit Search Delete	8	4	3

| | | Course Code: | SOE-B-CSE-21- 304 |

O P JINDAL UNIVERSITY
II B. Tech. III Semester Regular Examinations
Course Name : Formal Language and Automata Theory

R 21

| Time: 3 Hrs. | Program Name : B.Tech. | Program Code : 01UG020 | Max. Marks: 100 |

Answer any one question from each unit
All questions carry equal marks

			M	CO	KL
		Section-A			
1	a.	Distinguish between Moore and Melay Machine	2	CO1	K1
	b.	Define Finite State Machine	2	CO1	K1
	c.	State Arden's Theorem	2	CO2	K1
	d.	State Pumping Lemma	2	CO2	K1
	e.	Define Right Linear Grammar	2	CO3	K1
	f.	Define PDA	2	CO3	K1
	g.	Define Turing Machine	2	CO4	K1
	h.	Write a short notes on Chomsky hierarchy	2	CO4	K1
	i.	Define recursively enumerable languages	2	CO5	K1
	j.	Define of P and NP problems.	2	CO5	K1
		Section-B:			
		Unit-I (16 marks)			
2	a.	Construct the minimum state automata for the following 		0	1 | |---|---|---| 	→A	B	C | 	B	B	C | 	C	B	C | 	D	B	E | 	Ⓔ	B	C		10	CO1	K3
	b.	Design a FA that accept string with a's and b's such that the number of a's are divisible by 3.	6	CO1	K2
		OR			
3	a.	Design NFA accepting string with a's and b's such that string containing two consecutive a's or two consecutive b's	8	CO1	K3
	b.	Construct NFA without ε- moves for the following transition table 0 1 Є q0 φ φ { q0, q1, q2} q1 {q1} {q3} φ q2 {q3} {q2} φ q3 φ φ φ Where q0 is initial state and q3 is final state.	8	CO1	K3
		Unit-II (16 marks)			
4	a.	Construct NFA for the regular expression 0*1*(101)*11	8	CO2	K3
	b.	Convert Regular Expression (a + b)*(aa + bb)(a + b)* to NFA.	8	CO2	K3

		OR			
5	a.	Find the regular expression accepted by following DFA.	8	CO2	K3
	b.	Discuss the Pumping lemma for Context Free Languages concept with example.	8	CO2	K3
Unit-III (16 marks)					
6	a.	Show that the following CFG ambiguous. $S\rightarrow iCtS \mid iCtSeS \mid a$ $C\rightarrow b$	8	CO3	K3
	b.	Construct PDA for the language L={W\$W^r | where W $\in$ (a+b)*, W^r is reverse of W}.	8	CO3	K3
		OR			
7	a.	Prove that $S \rightarrow aSbS \mid bSaS \mid \in$ is ambiguous.	6	CO3	K2
	b.	Construct PDA for the language L={ $a^n b^n c^m$ | m,n>=1}	10	CO3	K3
Unit-IV (16 marks)					
8	a.	Use the following grammar : $S\rightarrow ABC \mid BbB$, $A\rightarrow aA \mid BaC$|aaa $B\rightarrow bBb$| a|D $C\rightarrow CA$|AC $D\rightarrow e$ Convert it into CNF.	10	CO4	K3
	b.	Design TM which will recognize strings containing equal number of a's and b's.	6	CO4	K2
		OR			
9	a.	Convert the following grammar to GNF $A1 \rightarrow A2\ A3$ $A2 \rightarrow A3\ A1 \mid b$ $A3 \rightarrow A1\ A2 \mid a$	8	CO4	K3
	b.	Construct a Turing Machine that accepts the language L $=$ {$1^n 2^n 3^n$ | n $>$ =1}.	8	CO4	K3
UNIT-V (16 marks)					
10	a.	Discuss about Universal Turing Machine	8	CO5	K3
	b.	Explain Post's Correspondence Problem with the help of an example	8	CO5	K3
		OR			
11	a.	Explain Chomsky's hierarchy of languages.	8	CO5	K3
	b.	Write short note on NP- Hard and NP-Complete Problem.	8	CO5	K3

		Course Code: SOE-B-CE305			

O P JINDAL UNIVERSITY
B. Tech. III Semester Regular Examinations
Disaster Management (Online)
(Offered to CE, ME, EE)

Time: 02 Hrs.			Max. Marks: 50		
		Answer any one question from each unit			
		All questions carry equal marks			
			M	**CO**	**KL**
Unit-I (10 marks)					
1	a.	Define the term 'Disaster'?	2	1	I
	b.	Summarize the various types of floods?	8	1	II
OR					
2	a.	Summarize the various types of droughts?	5	1	II
	b.	What are the various causes of forest fires?	5	1	I
Unit-II (10 marks)					
3	a.	Write down the process of EIA?	6	2	II
	b.	What are the shortcomings of EIA?	4	2	II
OR					
4	a.	What are the major elements of land-use planning?	4	2	I
	b.	Write a short note on "Traditional Disaster Resistant Construction Techniques"?	6	4	II
Unit-III (10 marks)					
5	a.	Write down the methods to mitigate the impact of the Tsunami?	5	3	II
	b.	Briefly illustrate various methods to mitigate the impact of cyclones?	5	3	II
OR					
6	a.	Briefly describe various methods to mitigate the damage due to Earthquake?	5	3	II
	b.	What are the various causes of Epidemics?	5	3	I
Unit-IV (10 marks)					
7	a.	Draw Disaster management cycle and briefly describe each term?	10	4	II
OR					
8	a.	Summarize the phases, focus, objectives and distinctive features of Community Based Disaster Management (CBDM)?	10	4	II
UNIT-V (10 marks)					
9	a.	What is NDRF and its role in case of disasters?	5	5	I
	b.	What are the other activities beside search and rescue operations undertaken during emergency situation in which NDRF is engaged?	5	5	I
OR					
10	a.	What are the immediate and long-term response of (i) Cyclone & (ii) Drought?	10	5	I

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O.P. JINDAL UNIVERSITY

B. Tech. VI Semester Regular Examination

Disaster Management (Open)

(Offered in CE, Me, CS)

Time: 3 Hrs. Max. Marks: 60

Answer any one question from each unit.

All questions carry equal marks.

Unit-I (16 marks)

1. a. Define the term "Disaster".
   b. Enumerate the various types of Floods.

OR

2. a. Summarize the various types of droughts.
   b. What are the various causes of forest fires?

Unit-II (16 marks)

3. a. Write down the process of ERA?
   b. What are the advantages of ERA?

OR

4. a. What are the main features of hazard planning?
   b. Write a short note on "Structural", "Non-structural", "Relational", "Personal" features?

Unit-III (16 marks)

5. a. Write down the mechanism required in the process of Risk Transfer?
   b. Briefly illustrate various mechanism available in the context of Risk transfer?

OR

6. a. Briefly explain mechanism required to mitigate the damage due to earthquake?
   b. What are the various features of Epidemics?

Unit-IV (14 marks)

7. a. Write down the role of NGO's and voluntary agencies in disaster?

OR

8. Enumerate the phases of the emergency and identify the response, recovery & mitigation phase during emergency (CASE)?

Unit-V (14 marks)

9. a. How will you make the people as disaster resilient?
   b. How will the role of an administration level (local) and district administration during disaster preparedness is crucial in developing a strategy?

OR

10. What are the various measures required to overcome the effects of Drought?