Course Code: SOE-M-MTA-105(3)

O P JINDAL UNIVERSITY

B. Tech First Semester End Semester Regular Examinations

Subject: Engineering Graphics

Class: B. Tech First Semester (Section – C)

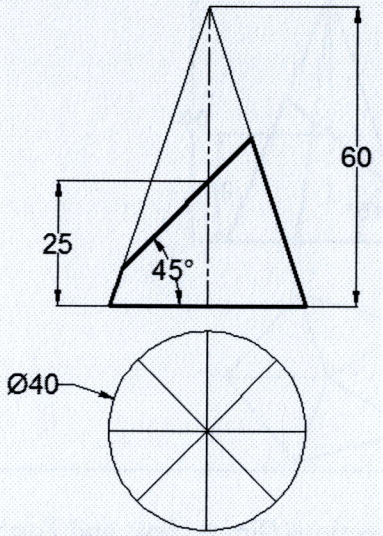
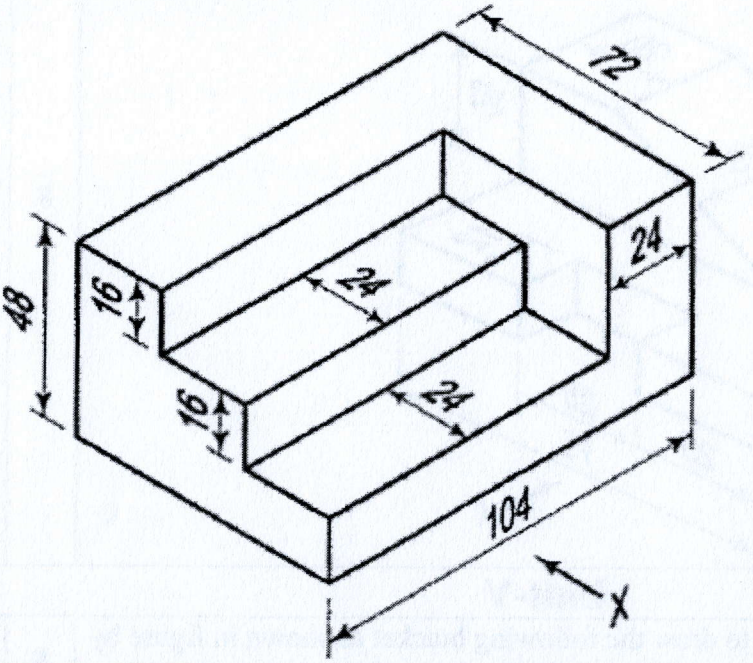
Time: 4 Hrs. **Max. Marks: 100**

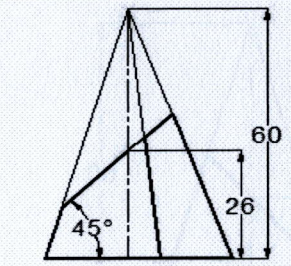
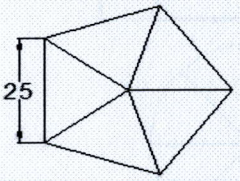
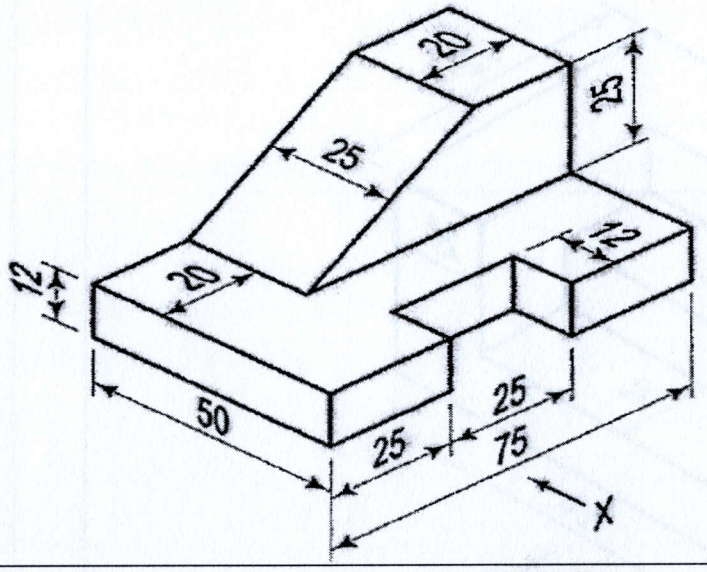
Note: 1) Answer any one question from each unit. 2) Use a drawing sheet to draw the Drawings and Use answer sheets to write the theory.

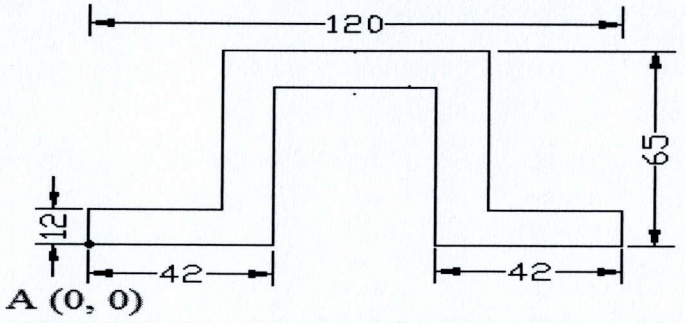
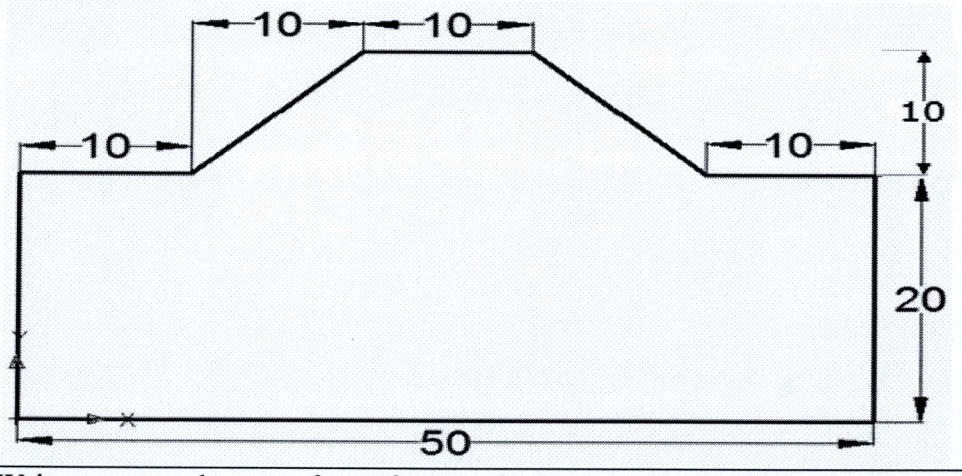
All questions carry equal marks

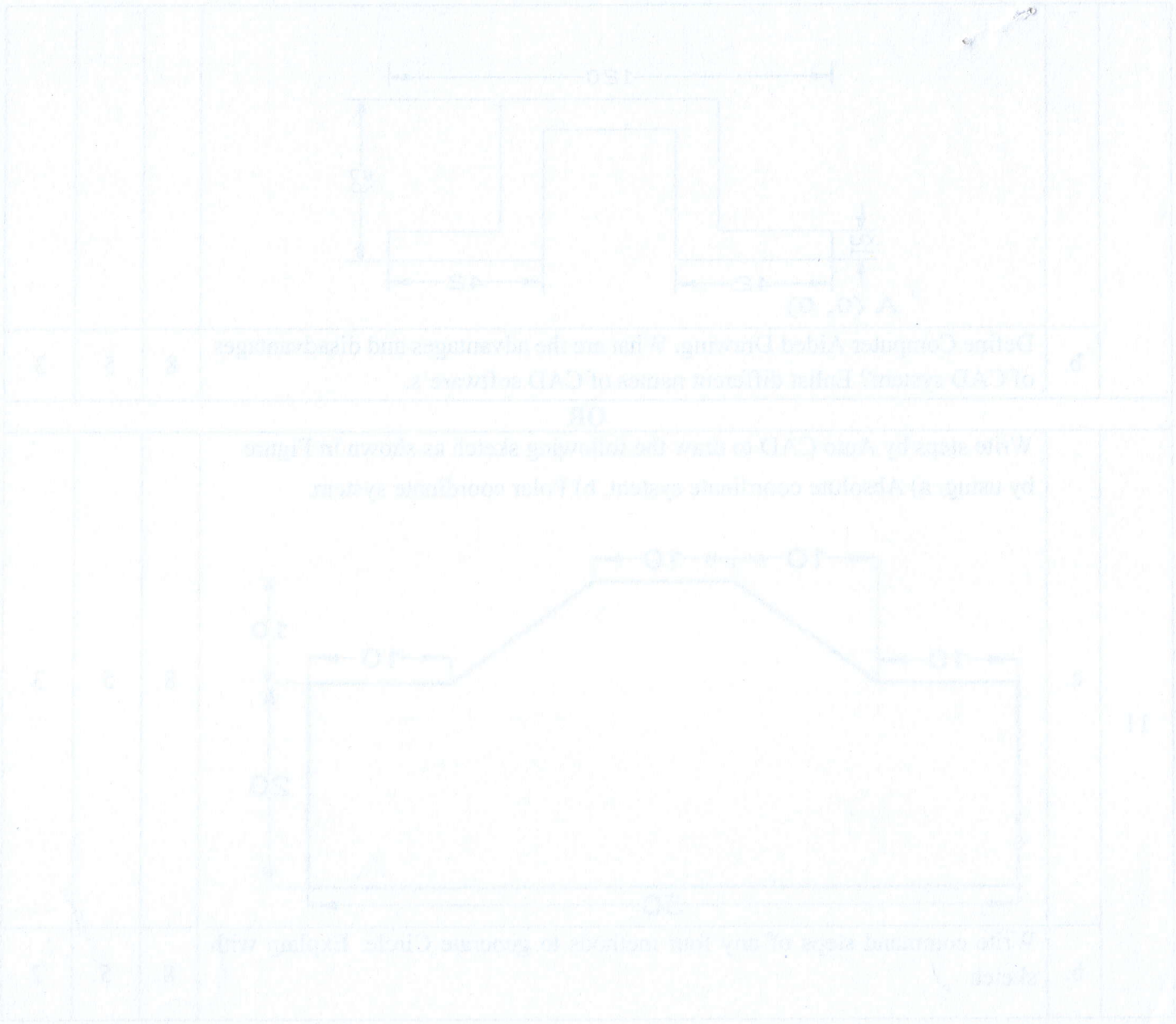
			M	CO	KL
Section-A					
1	a.	What is meant by Orthographic Projections? Give its practical examples.	2	5	1
	b.	What is the difference between Isometric Projection & Isometric view?	2	5	2
	c.	What is meant by Section? Why do we take the section?	2	4	1
	d.	What is meant by the Development of Solids? Give practical examples.	2	4	1
	e.	Enlist the merits of the Projection of lines	2	2	1
	f.	What is meant by a Section of Solids? give its examples	2	3	1
	g.	What is meant by First angle and third-angle methods of projections?	2	1	1
	h.	What are the outcomes of the Projection of Solids?	2	3	1
	i.	Define CAD and give its practical applications	2	1	1
	j.	Define Scale. How it is expressed.	2	1	2
Section-B: Unit-I					
2	a.	Construct a Scale of 1:5 to show decimeters and centimeters and to read up to 10 decimeters. Show a length of 7.6 decimeters on it.	8	1	2
	b.	Construct a Hypocycloid, for generating a circle of diameter 60 mm and directing circle of diameter 180 mm. Also, draw normal and tangent to it at any point on the curve.	8	1	2
OR					
3	a.	Construct an Epicycloid, for generating a circle of diameter 60 mm and directing circle of diameter 180 mm. Also, draw normal and tangent to it at any point on the curve.	8	1	3
	b.	Construct a Hyperbola by Directrix and Focus (General) Method, when the distance of the focus from the Directrix is equal to 65 mm.	8	2	3
Unit-II					
4	a.	A line AB, 65 mm long, has its end A 20 mm above H.P. and 25 mm in front of V.P. The end B is 40 mm above the H.P. and 65 mm in front of V.P. Draw the projections of line AB and find its inclinations with H.P. and V.P. Also locate traces. The line is in the first quadrant.	8	2	3
	b.	A Square ABCD of 50 mm side has its corner A in the H.P., its diagonal AC	8	2	2

		is inclined at 30^0 to the H.P. and the diagonal BD is inclined at 45^o to the V.P. and is parallel to the HP. Draw the projections of the plane.			
		OR			
5	a.	Draw the projections of a regular pentagonal plane of 30 mm side; it is resting on one of its edge on H.P. which is also perpendicular to VP. Its surface is inclined at 45^o to HP and the edge on which, it is resting on H.P. is inclined at 40^o to the V.P. Draw the projections of the plane.	8	2	2
	b.	A line AB 90 mm long is inclined at 30^0 to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the Top view of line AB and determine its inclinations with V.P. Also locate the traces.	8	2	2
		Unit-III			
6	a.	A square pyramid of 40 mm base side and axis 60 mm long has a triangular face on the ground and a vertical plane containing the axis makes an angle of 45^o with the V.P. Draw the projections, take apex nearer to V.P.	8	3	3
	b.	A Cylinder 60 mm diameter and an 80 mm length of axis it is resting on its base on HP so that the axis is perpendicular to HP and parallel to VP. It is cut by a sectional plane which is inclined at 40^o to HP and perpendicular to VP and cut the solids 40 mm from the base. Draw the FV, Sectional TV, sectional SV, and true shape of the section.	8	3	3
		OR			
7	a.	A Cone of 60 mm diameter and 75 mm length of axis it is resting on its base on HP so that the axis is perpendicular to HP and parallel to VP. It is cut by a sectional plane which is inclined at 45 degrees to HP and perpendicular to VP and cut the solids 35 mm from the base. Draw the FV, Sectional TV, sectional SV, and true shape of the section.	8	3	3
	b.	A Cylinder 65 mm diameter and 70 mm length of the axis is resting on its base on HP. Draw the projections of Solids when its axis is inclined 45^o to HP and 40^o to VP.	8	3	3
		Unit-IV			
8	a.	The cut section of a cone is as shown in Figure Draw **(i)** Sectional Top View **(ii)** True Shape of the section and **(iii)** Development of lateral surface of the remaining solid.	8	4	2

					
	b.	Draw the orthographic projections (Front view, Side view, and Top view) of the block as shown in the figure. 	8	4	3
		OR			
9	a.	The cut section of a pentagonal pyramid is shown in the figure Draw **(i)** Sectional Top View **(ii)** True Shape of the section & **(iii)** Development of the lateral surface of the remaining solid	8	4	3

		 			
	b.	(i) Draw the Isometric Scale. (ii) Draw the orthographic projections (Front view, and Top view) of the block as shown in the figure. . 	8	4	3
		Unit-V			
10	a.	Write steps by Auto CAD to draw the following bracket as shown in figure by using: **(i)** Absolute coordinate **(ii)** Polar coordinate system.	8	5	3

					
	b.	Define Computer Aided Drawing. What are the advantages and disadvantages of CAD system? Enlist different names of CAD software's.	8	5	3
		OR			
11	a.	Write steps by Auto CAD to draw the following sketch as shown in Figure by using: a) Absolute coordinate system, b) Polar coordinate system. 	8	5	3
	b.	Write command steps of any four methods to generate Circle. Explain with sketch	8	5	2



Course Code: SOE-B-FY101

O P JINDAL UNIVERSITY

B. Tech. Ist Semester Regular Examinations

Engineering Mathematics-I

Branch: CIVIL, EE, MECH, META **Program Code :**

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					
1	a.	Define Diagonal matrix and Unit matrix.	2	1	1
	b.	Define Cayley-Hamilton theorem.	2	1	1
	c.	Using Maclaurin's series expand the value of $\sin x$.	2	4	1
	d.	What is the radius of curvature for cartesian curve?	2	4	1
	e.	Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ if $z = \log(x^2 + y^2)$.	2	6	2
	f.	Define homogeneous function with example.	2	6	1
	g.	Find the value of $\beta\left(\frac{9}{2}, \frac{7}{2}\right)$.	2	8	2
	h.	Find $\int_2^5 \int_1^3 (x^2 + y^2) dx$.	2	7	2
	i.	Find ∇f for $f(x, y, z) = xy^3 + yz^3$.	2	9	2
	j.	Define Green's theorem	2	10	1
Section-B: Unit-I					
2	a.	Find the Inverse of the Matrix by Gauss Jordan Method: $\begin{bmatrix} 8 & -1 & -3 \\ -5 & 1 & 2 \\ 10 & -1 & -4 \end{bmatrix}$	8	1	3
	b.	Find all the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$.	8	2	3
OR					

3	a.	Find all the eigen values and eigen vectors of the matrix $A=\begin{bmatrix} -2 & 1 & 1 \\ -6 & 1 & 3 \\ -12 & -2 & 8 \end{bmatrix}$.	8	2	3
	b.	Verify the Caley-Hamilton theorem for the matrix $A=\begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and find A^{-1} and A^4.	8	1	3
		Unit-II			
4	a.	If $y=\cos(m\log x)$, prove that $x^2y_{n+2}+(2n+1)xy_{n+1}+(m^2+n^2)y_n=0$.	8	3	3
	b.	Find all the asymptotes of $x^3+3x^2y-xy^2+3y^3+x^2-2xy+3y^2+4x+7=0$	8	3	3
		OR			
5	a.	If $y=\sin^{-1}x$, prove that $(1-x^2)y_{n+2}-(2n+1)xy_{n+1}-n^2y_n=0$. Also find y_n at $x=0$.	8	3	3
	b.	Find all the asymptotes of $x^3-5x^2y+8xy^2-4y^3+x^2-3xy+2y^2-1=0$.	8	3	3
		Unit-III			
6	a.	If z is a homogeneous function of degree n in x and y show that $x^2\frac{\partial^2 z}{\partial x^2}+2xy\frac{\partial^2 z}{\partial x\partial y}+y^2\frac{\partial^2 z}{\partial y^2}=n(n-1)z$.	8	5	3
	b.	If $\int_0^{\frac{\pi}{2}}\frac{dx}{a+b\cos x}=\frac{\pi}{\sqrt{a^2-b^2}}(a>b)$, Evaluate $\int_0^{\pi}\frac{dx}{(a+b\cos x)^2}$ and $\int_0^{\pi}\frac{\cos x\,dx}{(a+b\cos x)^2}$.	8	6	3
		OR			
7	a.	If $u=\log(x^3+y^3+z^3-3xyz)$, show that $\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)^2 u=\frac{-9}{(x+y+z)^2}$.	8	5	3
	b.	Examine $f(x,y)=x^4+y^4-2x^2-2y^2+4xy$ for extreme values.	8	6	3

Unit-IV					
8	a.	Show that $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \begin{cases} \frac{(n-1)(n-3)(n-5).....}{n(n-2)(n-4).....}, if\ n\ is\ odd. \\ \frac{(n-1)(n-3)(n-5).....}{n(n-2)(n-4).....} \times \frac{\pi}{2}, if\ n\ is\ even \end{cases}$ and hence find $\int_0^{\frac{\pi}{2}} \sin^9 x\,dx$	10	7	3
	b.	Evaluate $\int_0^1 \int_0^{\sqrt{(1-x^2)}} \int_0^{\sqrt{(1-x^2-y^2)}} xyz\,dzdydx$	6	7	3
OR					
9	a.	Find the reduction formula for $\int \cos^m x \sin nx\,dx$ and also find $\int_0^{\frac{\pi}{2}} \cos^m x \cos nx\,dx$.	10	7	3
	b.	Evaluate $\iint xy\,dxdy$ over the positive quadrant of the circle $x^2 + y^2 = a^2$.	6	7	3
UNIT-V					
10	a.	Evaluate $div\,F$ and $curl\,F$ at the point (1,1,2) for $F = x^2yzI + xy^2zJ + xyz^2K$	8	9	3
	b.	What is the directional derivative of $\phi = xy^2 + yz^3$ at the point (2,−1,1) in the direction of the normal to the surface $x\log z - y^2 = -4$ at (−1,2,1)?	8	9	3
OR					
11	a.	Apply Green's theorem to evaluate $\int_C [(2x^3 - y^2)dx + (x^2 + y^2)dy]$, where C is the boundary of the area enclosed by the x-axis and the upper half of the circle $x^2 + y^2 = a^2$.	8	10	3
	b.	Evaluate $\int_C [(x^2 - xy)dx + (x^2 + y^2)dy]$, where C is the square formed by the lines $x = \pm 1$ and $y = \pm 1$.	8	10	3

Course Code: SOE-B-FY102

O P JINDAL UNIVERSITY

B. Tech. I Semester Examinations

ENGINEERING CHEMISTRY

(Offered to CIVIL, EE, MECH, MME)

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

		Answer all questions in Section-A. Answer one question set from each unit in Section-B	**M**	**CO**	**KL**
		Section-A			
1	a.	If a coal sample contains 15% moisture, 9% volatile matter and 17% ash, what is the fixed carbon content in the coal sample?	2	CO-2	III
	b.	What is the main reason of temporary hardness in water?	2	CO-1	II
	c.	Dissolved sodium hydroxide in boiler water causes _____. 100 mg/L is equal to _____ ppm.	2	CO-2	III
	d.	1 g coal sample loses weight of 0.09 g weight on heating at 110 degree centigrade for 1 h. The percentage of moisture in the coal is_____.	2	CO-3	IV
	e.	What is monomer and degree of polymerization?	2	CO-1	I
	f.	What is stress corrosion?	2	CO-1	II
	g.	Write the correlation between rate constant and activation energy.	2	CO-2	III
	h.	For a reaction if the concentration of reactant X is four times, the rate of reaction becomes sixty-four times. What is the order of the reaction?	2	CO-2	IV
	i.	What is the role of catalyst in a chemical reaction?	2	CO-1	II
	j.	Give examples of natural and synthetic polymers.	2	CO-3	I
		Section-B:			
		Unit-I			
2	a.	Derive the integrated form of expression for zero and first order reaction kinetics.	8	CO-3	IV
	b.	The first order decomposition of H_2O_2 is 50% complete in 40 min at 27°C. The same reaction is 50% complete in 10 min at 77°C. Calculate the activation energy for the decomposition of H_2O_2.	8	CO-2	III
		OR			
3	a.	The half-life period for the decomposition of P_2O_5 at 300 K is 7 h and is independent of the initial pressure of P_2O_5. Calculate (a) the specific rate constant and (b) the time required to go to 80% decomposition.	8	CO-2	III
	b.	For the chemical reaction X + Y → P, the rate is doubled when the concentration of Y is doubled and the rate becomes 8 times when the concentration of both X and Y are doubled. Write the rate law for the reaction. What is the order with respect to X and Y?	8	CO-1	II

Unit-II					
4	a.	Explain various types of corrosion.	8	CO-1	II
	b.	Discuss various methods to protect the material from corrosion.	8	CO-3	III
OR					
5	a.	Calculate the amount of lime-soda needed for softening 10000 L of water containing following per litre: $Ca(HCO_3)_2$ = 162 mg; Mg $(HCO_3)_2$ = 73 mg; $MgCl_2$ = 95 mg; $CaSO_4$ =136 mg; NaCl = 585 mg.	8	CO-3	III
	b.	What is caustic embrittlement, priming and foaming? What are preventive measures?	8	CO-1	II
Unit-III					
6	a.	1 litre water sample from a well in Raigarh contains the following impurities: NaCl = 585 mg; $Ca(HCO_3)_2$ = 162 mg; $Mg(HCO_3)_2$ = 73 mg; $MgCl_2$ = 95 mg; $CaSO_4$ =136 mg. Calculate temporary and total hardness of water.	8	CO-2	III
	b.	Discuss different methods of internal treatment of water.	8	CO-3	II
OR					
7	a.	A coal sample was found to have the following composition: C = 84%, H = 2%, N = 1%, S = 1%, ash = 8% and rest oxygen. Calculate the Gross and Net Calorific value of coal sample.	8	CO-2	III
	b.	Discuss the main requisites for good metallurgical coke.	8	CO-1	II
Unit-IV					
8	a.	A coal sample was analyzed as follows: (i) 2.5 g air dried coal sample was heated in a silica crucible at 110 degree centigrade for 1 hour. The residue weight was found to be 2.415 g. (ii) The crucible was then covered with a vented lid and heated at 1000 degree centigrade for 7 min. The residue was weighed to be 1.528 g. (iii) The crucible was again heated without cover until a constant weight of 0.245 g was obtained. Analyze the coal sample (proximate analysis) from the above experiment.	8	CO-2	IV
	b.	Illustrate the process of carbonization of coal.	8	CO-3	II
OR					
9	a.	Discuss thermoplastic polymers, thermoset polymers, homopolymers and copolymers with examples.	8	CO-1	III
	b.	Explain Ziegler –Natta polymerization.	8	CO-2	II
UNIT-V					
10	a.	Discuss the mechanism of free radical polymerization reaction.	8	CO-2	II
	b.	Write notes on Bakelite, Nylon 6,6.	8	CO-3	III
OR					
11	a.	Discuss the mechanism of ionic polymerization reaction.	8	CO-2	II
	b.	Illustrate step growth polymerization reaction.	8	CO-1	II

Course Code: SOE-B-FY103

OP JINDAL UNIVERSITY

B.Tech. I Semester Regular Examinations

PHYSICS-I

(Offered to B.Tech.)

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 conditions for interference.	2	CO3	K1
	b.	What is grating element? Calculate the value of grating element of a diffraction grating having 500 lines/inch.	2	CO3	K1
	c.	Sketch the graph of temperature-dependent resistivity of a semiconductor.	2	CO1	K1
	d.	Why is common emitter (CE) transistor preferred as amplifier in electronics compared with CB and CC amplifier?	2	CO2	K1
	e.	What are Einstein coefficients? Give their physical significances.	2	CO4	K1
	f.	What is conservative force? Give an example.	2	CO4	K1
	g.	Write down the diode equations in forward and reverse bias.	2	CO2	K1
	h.	Define equipotential surface and give an example of equipotential surface.	2	CO4	K1
	i.	Why does conductivity increase with increase in temperature in semiconductor?	2	CO1	K1
	j.	Consider a n-type semiconductor having electron density of $10^{17}/cm^3$. What will be the sign and value of Hall coefficient for this material?	2	CO2	K1
Section-B: **Unit-I**					
2	a.	Consider an intrinsic semiconductor and derive its conductivity.	10	CO1	K3
	b.	Describe ionized impurity scattering and lattice scattering phenomena in a doped semiconductor.	6	CO1	K2
OR					
3	a.	Describe formation of energy bands in solids using suitable diagrams and discuss about valence band and conduction band.	10	CO1	K3
	b.	Discuss how conductivity and mobility in intrinsic and doped semiconductor are calculated and describe their temperature dependency.	6	CO1	K2
Unit-II					
4	a.	Describe donor and acceptor impurities using suitable diagrams and write the formulae to calculate their denstities.	10	CO2	K3

	b.	What is Fermi level? Draw the energy level diagrams showing the Fermi levels in intrinsic, p-doped and n-doped semiconductors.	6	CO2	K2
		OR			
5	a.	Draw the circuit diagram of common emitter transistor amplifier and describe its working.	10	CO2	K3
	b.	Determine and sketch the position of Fermi level in intrinsic semiconductor if effective mass of the hole is 5 times of the effective mass of the electron at room temperature. Given: Thermal energy at room temperature = 25 meV	6	CO2	K2
		Unit-III			
6	a.	Explain spontaneous and stimulated emission with suitable energy level diagrams with their important features. Give the example of a device which shows spontaneous emission.	10	CO4	K3
	b.	What is population inversion? Discuss how it is achieved.	6	CO4	K2
		OR			
7	a.	Describe the construction and working of He-Ne laser.	10	CO4	K3
	b.	Describe monochromaticity and directionality in laser with examples.	6	CO4	K2
		Unit-IV			
8	a.	What is harmonic oscillator? Prove that total energy of harmonic oscillator is ½ $m\omega^2a^2$, where ω is angular frequency and a is amplitude of oscillation.	10	CO4	K3
	b.	Give physical significance of gradient of a scalar field. Give expression for relation between potential energy and force.	6	CO4	K2
		OR			
9	a.	What is forced oscillation? Derive the differential equation for forced oscillation.	10	CO4	K3
	b.	Discuss the properties of equipotential surfaces.	6	CO4	K2
		UNIT-V			
10	a.	Consider the Newton's ring formed due to reflected light and prove that diameter of nth dark ring is $d_n = \sqrt{\frac{4n\lambda R}{\mu}}$, where μ is refractive index, λ is wavelength of light, R is radius of curvature and n = 0, 1, 2,…….	10	CO3	K3
	b.	If the diameter of nth dark ring in an arrangement giving Newton's rings changes from 3 mm to 2.5 mm as a liquid is introduced between the lenses and plate, what is the value of refractive index of the liquid ?	6	CO3	K2
		OR			
11	a.	Describe the construction and theory of Fresnel biprism.	10	CO3	K3
	b.	Discuss the application of Newton's ring experiment to determine the wavelength of light.	6	CO3	K2

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Course Code: SOE-B-FY104

O P JINDAL UNIVERSITY

B. Tech. Ist Semester Regular Examinations

Basic Computing

(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.	Discuss different types of Computer Languages?	10	CO1	KL1
	b.	Differentiate Compiler, Assembler and Linker	10	CO2	KL3
OR					
2	a.	What are the generations on computer explain in brief.	10	CO1	KL1
	b.	Write the basic features of computers.	10	CO3	KL2
Unit-II					
3	a.	Explain logical and relational operators in C language with appropriate example.	10	CO2	KL1
	b.	Explain conditional operator with example. Also write a C program to find the largest of three numbers using ternary operator.	10	CO3	KL3
OR					
4	a.	Write a program to find factorial of a number.	10	CO4	KL3
	b.	Describe Variables, data types and identifiers in C language.	10	CO3	KL2
Unit-III					
5	a.	Explain if, if-else, nested if-else and cascaded if-else with examples and syntax.	10	CO1	KL3
	b.	Show how break and continue statements are used in a C-program, with example.	10	CO2	KL2
OR					
6	a.	What is switch-case statements, explain with appropriate example.	10	CO4	KL2
	b.	Write a program in C to find the area and perimeter of a rectangle.	10	CO2	KL2
Unit-IV					
7	a.	What is an array? How are a single dimension and two-dimension arrays declared and initialized?	10	CO3	KL1
	b.	Write a program for an array to print the element of 3rd indexing, also initialize the size of array as 6.	10	CO2	KL1
OR					
8	a.	Write a c-program using functions to generate the Fibonacci series.	10	CO1	KL1
	b.	What is recursion? Explain with appropriate example.	10	CO1	KL1
UNIT-V					
9	a.	What is call by address? Also write a C program to swap two numbers using call by address (pointers or reference) method.	10	CO3	KL1
	b.	What is structure? Explain the C syntax of structure declaration with example.	10	CO3	KL2
OR					
10	a.	What is pointer? Write the advantages and disadvantages of pointer data type.	10	CO4	KL2
	b.	Explain the File handling in C programming.	10	CO1	KL2

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Course Code: SOE-B-FY106

O P JINDAL UNIVERSITY

B. Tech. I Semester Regular Examinations Feb 2023

Basic Electrical and Electronics Engineering (BEEE)

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

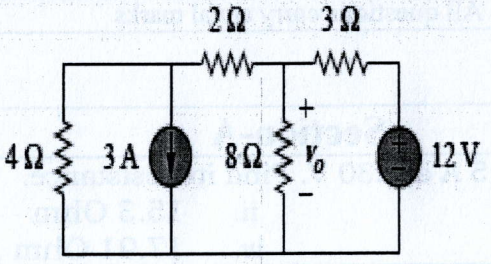
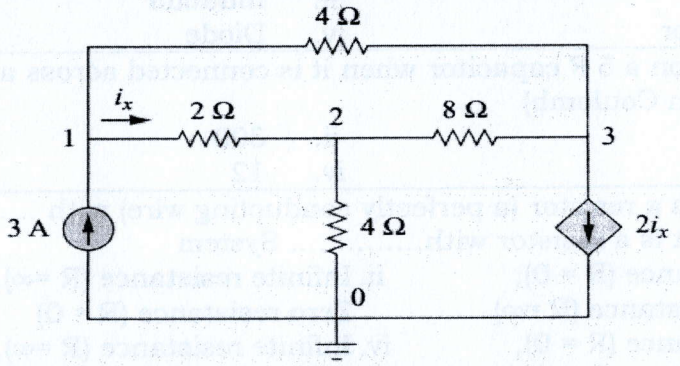
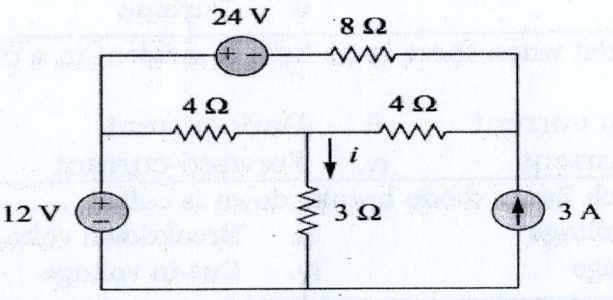
Section A is compulsory

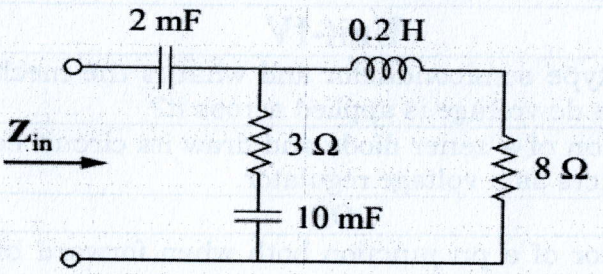
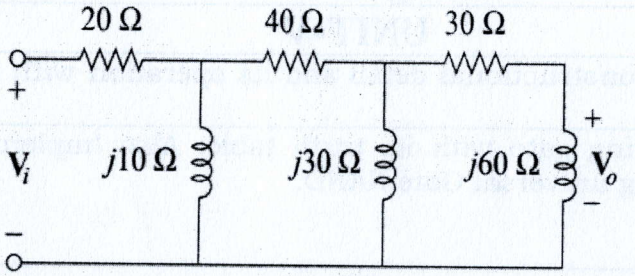
Answer any one question from each unit

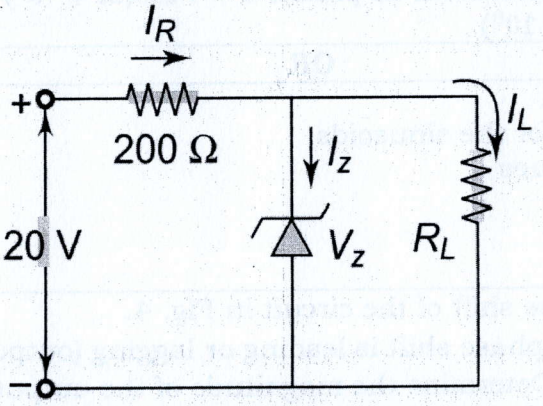
All questions carry equal marks

			M	CO	KL
		Section-A			
1	a.	An electric iron draws 15 A at 230 V. Find its resistance. i. 18.2 Ohm ii. 15.3 Ohm iii. 13.7 Ohm iv. 17.91 Ohm	2	1	1
	b.	The maximum current that a 2W, 80 k resistor can safely conduct is i. 160 kA ii. 40 kA iii. 5 mA iv. 25 μA	2	1	1
	c.	Which of the following is not a linear electrical component i. Resistor ii. Inductor iii. Capacitor iv. Diode	2	1	1
	d.	What charge is on a 5 F capacitor when it is connected across a 120 V source?(in Coulomb) i. 600 ii. 300 iii. 24 iv. 12	2	2	2
	e.	A short circuit is a resistor (a perfectly conducting wire) with ..... . An open circuit is a resistor with..... System i. Zero resistance (R = 0), infinite resistance (R =∞) ii. Infinite resistance (R =∞), Zero resistance (R = 0) iii. Zero resistance (R = 0), Zero resistance (R = 0) iv. Infinite resistance (R =∞), Infinite resistance (R =∞)	2	2	2
	f.	Faraday's law of electromagnetic induction is not applicable in..... i. Generator ii. Transformer iii. Motor iv. Turbine	2	3	1
	g.	The .....current exist when there is no light is incident in a photo diode i. Saturation current ii. Dark current iii. Reverse current iv. Forward current	2	3	1
	h.	The voltage at which Zener diode breaks down is called..... i. Avlanche voltage ii. Breakdown voltage iii. Zener Voltage iv. Cut-in voltage	2	4	2
	i.	Which is a current controlled device.... i. Rectifier ii. Transistor iii. Transformer iv. Logic gates	2	4	1
	j.	Fleming's left hand rule is applixable to find the direction of..... in..... i. Voltage, motors ii. Force,motors iii. Current, generator iv. Current in transformer	2	4	1

Section-B:
Unit-I

2	a.	Discuss KCL and KVL with suitable example and their limitations.	8	1	2
	b.	Discuss Star-delta and delta-star conversions and solve the following Use source transformation to find Vo in the circuit in Fig. 1  Fig 1	8	1	2
		OR			
3	a.	Determine the voltages at the nodes 1, 2 and 3 in Fig. 2  Fig 2	8	1	2
	b.	1. For the circuit in Fig. 3, use the superposition theorem to find *i*.  Fig. 3	8	1	2
		Unit-II			
4	a.	Find the input impedance of the circuit in Fig. 3. Assume that thecircuit operates atw= 50 rad/s.	8	2	1

		 Fig. 3			
	b.	i. Evaluate the following complex no. conj[(5+2i)(-1+4i)-5∠60] and $\frac{10+5i+3\angle 40^0}{-3+4i}+10\angle 30^0+5i$ ii. Express these sinusoids as phasor $v = 7\cos(2t + 40^0)$ *and* $i = -4\sin(10t + 10^0)$	8	2	1
		OR			
5	a.	Define the following for the sinusoids i. Average values ii. RMS value iii. Form factor iv. Peak factor	8	2	2
	b.	Calculate the phase shift of the circuit in Fig. 4. State whether the phase shift is leading or lagging (output with respect to input). Determine the magnitude of the output when the input is 120 V.  Fig.4	8	2	2
		Unit-III			
6	a.	State and explain Faraday's Law of electromagnetic induction. What is Lenz's law?	8	3	1
	b.	A conductor of length 150 cm moves at right angle to a uniform magnetic field of flux density 1.5 Wb/m² with a velocity of 60 m/s. Calculate the emf induced in it. Find also the induced emf if the conductor moves at an angle of 30⁰ to the direction of the field.	8	3	2
		OR			
7	a.	Explain how is an emf induced i. Statically ii. Dynamically	8	3	2
	b.	A coil of 1500 turns gives rise to magnetic flux of 2.5 mWb, when	8	3	2

		carrying a certain current. If this is completely reversed in 0.2 s, what is the average voltage induced in the coil.			
		Unit-IV			
8	a.	Explain what is p-type semiconductor and what is the mechanism of current flow when a dc voltage is applied across it?	8	4	3
	b.	Explain the operation of a zener diode and draw its circuit equivalent. How azener diode acts as a voltage regulator.	8	4	2
		OR			
9	a.	Discuss the behavior of a pn junction both when forward biased and reversed biased with suitable V-I characteristics diagram.	8	4	2
	b.	The circuit of Fig. 5 has a zener diode connected across the load. i. For R_L = 180 Ω, determine all currents and voltages. ii. Repeat part (a) for R_L = 450 Ω. iii. Find the value of R_L for the zener to draw maximum power. iv. Find the minimum value of R_L for the zener to be just in on-state.  Fig. 5	8	4	2
		UNIT-V			
10	a.	Discuss the BJT constructional detail and its operation with suitable diagram.	8	5	3
	b.	Explain the following gate with its truth table. Also Implement the following gate using universal Gate NAND. i. AND ii. OR	8	5	1
		OR			
11	a.	Discuss the BJT configuration and its characteristics in detail with suitable diagram.	8	5	2
	b.	Explain the following gate with its truth table. Also Implement the following gate using universal Gate NOR. i. AND ii. OR	8	5	2

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Course Code: SOE-M-MTA-105(3)

O P JINDAL UNIVERSITY

B. Tech First Semester End Semester Regular Examinations

Subject: Engineering Graphics

Class: B. Tech First Semester (Section – C)

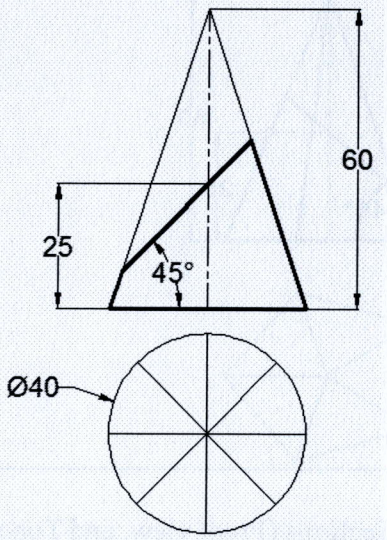
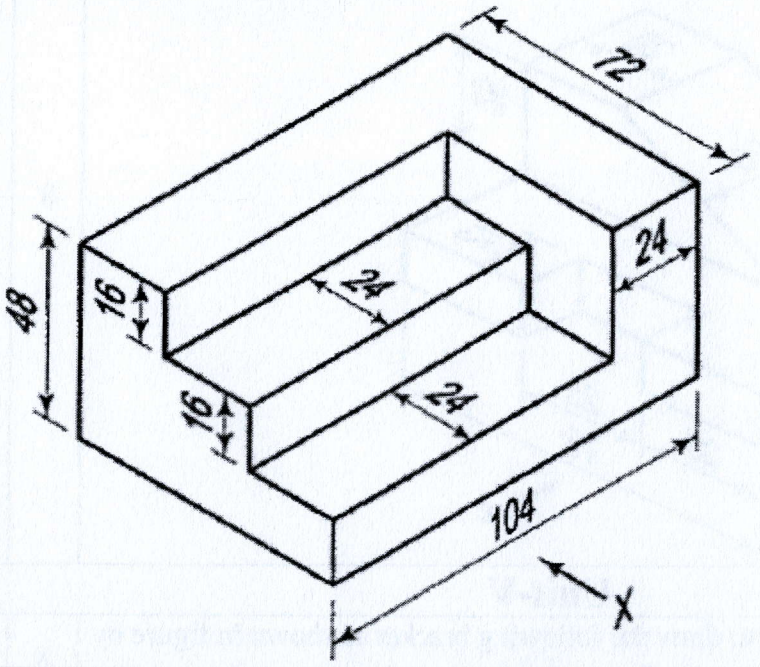
Time: 4 Hrs. **Max. Marks: 100**

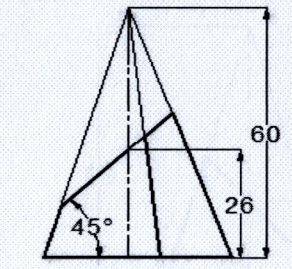
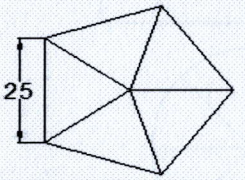
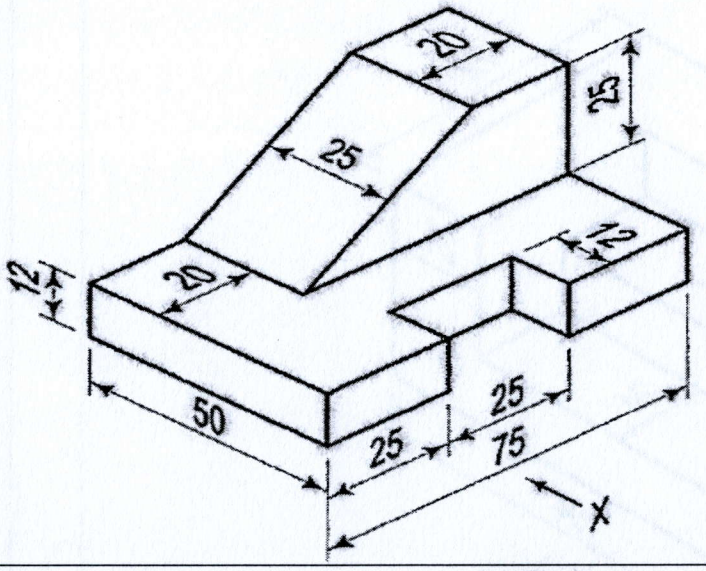
Note: 1) Answer any one question from each unit. 2) Use a drawing sheet to draw the Drawings and Use answer sheets to write the theory.

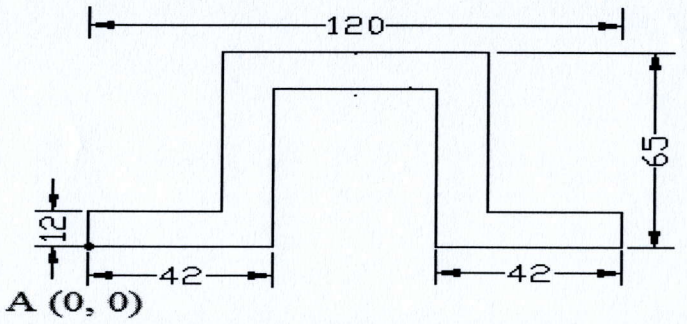
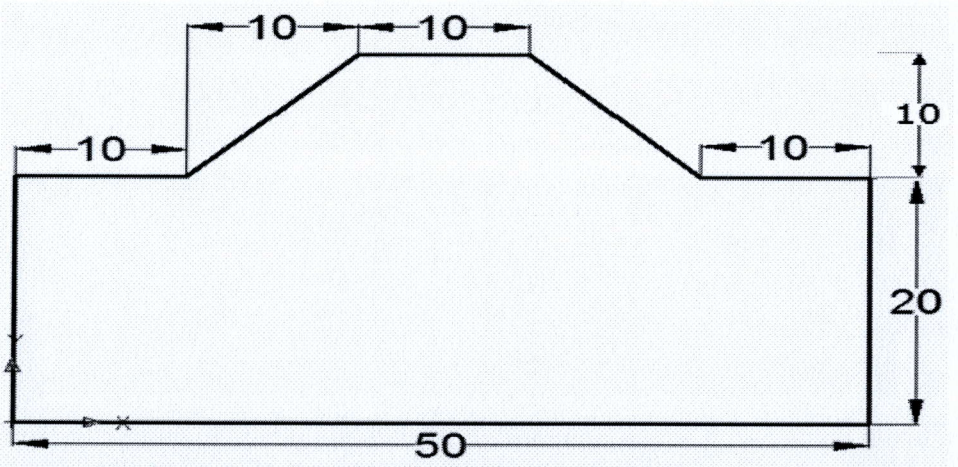
All questions carry equal marks

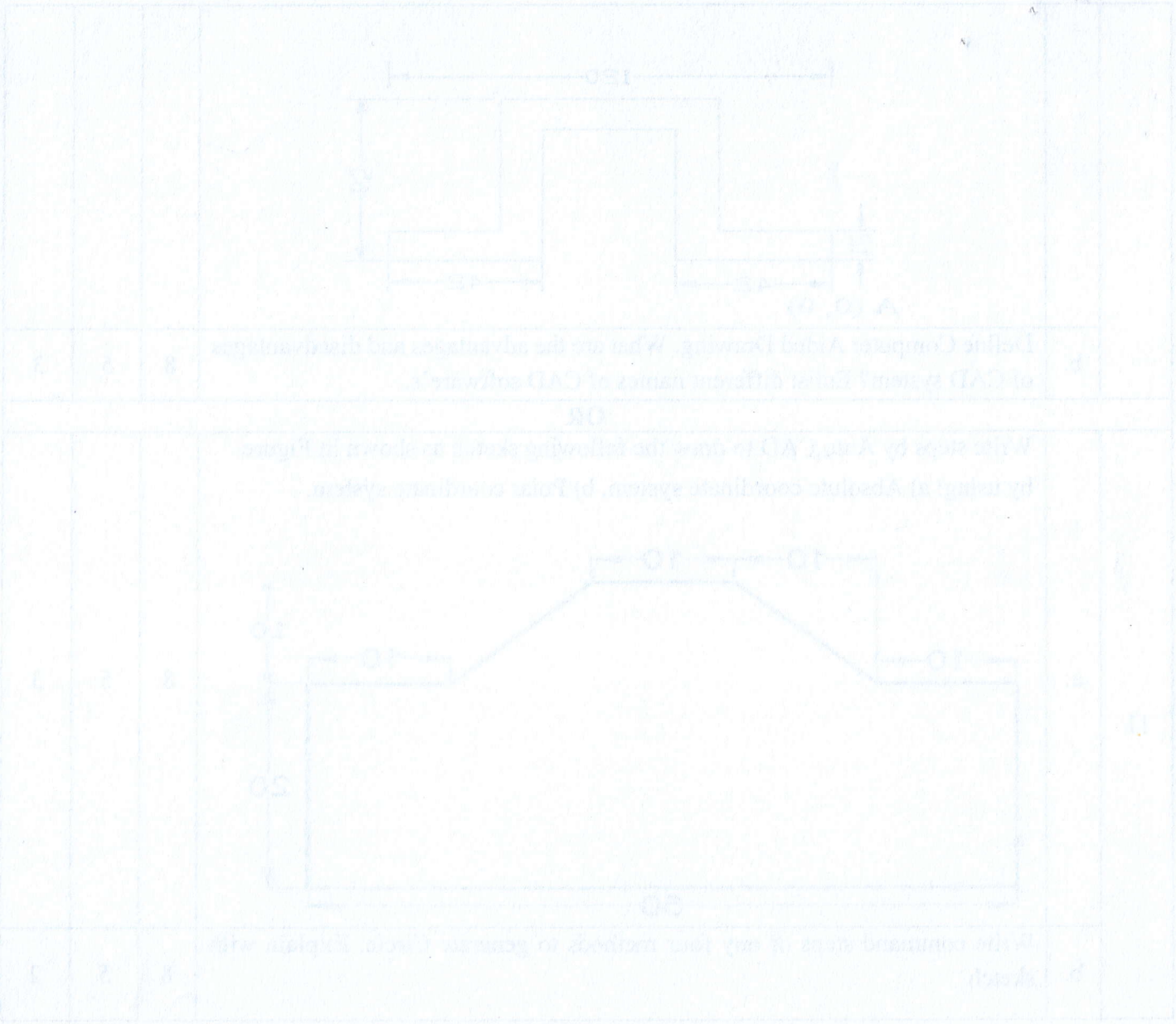
			M	CO	KL
Section-A					
1	a.	What is meant by Orthographic Projections? Give its practical examples.	2	5	1
	b.	What is the difference between Isometric Projection & Isometric view?	2	5	2
	c.	What is meant by Section? Why do we take the section?	2	4	1
	d.	What is meant by the Development of Solids? Give practical examples.	2	4	1
	e.	Enlist the merits of the Projection of lines	2	2	1
	f.	What is meant by a Section of Solids? give its examples	2	3	1
	g.	What is meant by First angle and third-angle methods of projections?	2	1	1
	h.	What are the outcomes of the Projection of Solids?	2	3	1
	i.	Define CAD and give its practical applications	2	1	1
	j.	Define Scale. How it is expressed.	2	1	2
Section-B: Unit-I					
2	a.	Construct a Scale of 1:5 to show decimeters and centimeters and to read up to 10 decimeters. Show a length of 7.6 decimeters on it.	8	1	2
	b.	Construct a Hypocycloid, for generating a circle of diameter 60 mm and directing circle of diameter 180 mm. Also, draw normal and tangent to it at any point on the curve.	8	1	2
OR					
3	a.	Construct an Epicycloid, for generating a circle of diameter 60 mm and directing circle of diameter 180 mm. Also, draw normal and tangent to it at any point on the curve.	8	1	3
	b.	Construct a Hyperbola by Directrix and Focus (General) Method, when the distance of the focus from the Directrix is equal to 65 mm.	8	2	3
Unit-II					
4	a.	A line AB, 65 mm long, has its end A 20 mm above H.P. and 25 mm in front of V.P. The end B is 40 mm above the H.P. and 65 mm in front of V.P. Draw the projections of line AB and find its inclinations with H.P. and V.P. Also locate traces. The line is in the first quadrant.	8	2	3
	b.	A Square ABCD of 50 mm side has its corner A in the H.P., its diagonal AC	8	2	2

		is inclined at 30^0 to the H.P. and the diagonal BD is inclined at 45^o to the V.P. and is parallel to the HP. Draw the projections of the plane.			
		OR			
5	a.	Draw the projections of a regular pentagonal plane of 30 mm side; it is resting on one of its edge on H.P. which is also perpendicular to VP. Its surface is inclined at 45^o to HP and the edge on which, it is resting on H.P. is inclined at 40^o to the V.P. Draw the projections of the plane.	8	2	2
	b.	A line AB 90 mm long is inclined at 30^0 to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the Top view of line AB and determine its inclinations with V.P. Also locate the traces.	8	2	2
		Unit-III			
6	a.	A square pyramid of 40 mm base side and axis 60 mm long has a triangular face on the ground and a vertical plane containing the axis makes an angle of 45^o with the V.P. Draw the projections, take apex nearer to V.P.	8	3	3
	b.	A Cylinder 60 mm diameter and an 80 mm length of axis it is resting on its base on HP so that the axis is perpendicular to HP and parallel to VP. It is cut by a sectional plane which is inclined at 40^o to HP and perpendicular to VP and cut the solids 40 mm from the base. Draw the FV, Sectional TV, sectional SV, and true shape of the section.	8	3	3
		OR			
7	a.	A Cone of 60 mm diameter and 75 mm length of axis it is resting on its base on HP so that the axis is perpendicular to HP and parallel to VP. It is cut by a sectional plane which is inclined at 45 degrees to HP and perpendicular to VP and cut the solids 35 mm from the base. Draw the FV, Sectional TV, sectional SV, and true shape of the section.	8	3	3
	b.	A Cylinder 65 mm diameter and 70 mm length of the axis is resting on its base on HP. Draw the projections of Solids when its axis is inclined 45^o to HP and 40^o to VP.	8	3	3
		Unit-IV			
8	a.	The cut section of a cone is as shown in Figure Draw **(i)** Sectional Top View **(ii)** True Shape of the section and **(iii)** Development of lateral surface of the remaining solid.	8	4	2

					
	b.	Draw the orthographic projections (Front view, Side view, and Top view) of the block as shown in the figure. 	8	4	3
		OR			
9	a.	The cut section of a pentagonal pyramid is shown in the figure Draw **(i)** Sectional Top View **(ii)** True Shape of the section & **(iii)** Development of the lateral surface of the remaining solid	8	4	3

		 			
	b.	(i) Draw the Isometric Scale. (ii) Draw the orthographic projections (Front view, and Top view) of the block as shown in the figure. . 	8	4	3
		Unit-V			
10	a.	Write steps by Auto CAD to draw the following bracket as shown in figure by using: **(i)** Absolute coordinate **(ii)** Polar coordinate system.	8	5	3

					
	b.	Define Computer Aided Drawing. What are the advantages and disadvantages of CAD system? Enlist different names of CAD software's.	8	5	3
		OR			
11	a.	Write steps by Auto CAD to draw the following sketch as shown in Figure by using: a) Absolute coordinate system, b) Polar coordinate system. 	8	5	3
	b.	Write command steps of any four methods to generate Circle. Explain with sketch	8	5	2



Course Code: B20CSOE02

O P JINDAL UNIVERSITY

I B. Tech. I Semester Regular Examinations

INTRODUCTION TO PROGRAMMING

(Offered to CS)

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 indentation?	2	1	1
	b.	Distinguish between local and global variables with examples.	2	1	1
	c.	Differentiate between an error and exception.	2	1	2
	d.	Can a Python function return multiple values? If yes, how it works?	2	2	1
	e.	What is package in Python?	2	2	1
	f.	What is __init__?	2	2	1
	g.	What is docstring in Python?	2	3	2
	h.	What is slicing in Python?	2	3	1
	i.	What is type casting and how is it performed?	2	4	2
	j.	What is dictionary in python language.	2	4	1
Section-B: Unit-I					
2	a.	Who uses python today? What are Python's technical strengths?	10	1	3
	b.	What are the different loop control statements available in python? Explain with suitable examples.	10	1	3
OR					
3	a.	List different conditional statements in python with appropriate examples.	10	1	3
	b.	Explain about built-in functions of tuple.	10	1	3
Unit-II					
4	a.	What type of parameter passing is used in Python? Justify your answer with sample programs.	10	2	3
	b.	What are lists and tuples? What is the key difference between the two?	10	2	3
OR					
5	a.	Explain about except clause with multiple exceptions.	10	2	3
	b.	How to handle an exception using try except block? Explain with the help of a program.	10	2	3
Unit-III					
6	a.	How to create a module and use it in a python program explain with an example.	10	3	3

	b.	What is break, continue and pass in Python?	10	3	3
OR					
7	a.	What is package in Python? Explain, how can you use package in your program with an example code?	10	3	3
	b.	Write a Python program that creates a GUI with a textbox, Ok button and Quit button. On clicking Ok, the text entered in textbox is to be printed in Python shell; on clicking Quit, the program should terminate.	10	3	3
Unit-IV					
8	a.	Write a Python program that interchanges the first and last characters of a given string.	10	4	3
	b.	What is inheritance? Explain different types of inheritance with example.	10	4	3
OR					
9	a.	Write a Python program to convert height in feet and inches to cm. [1 feet = 12 inch and 1 inch= 2.54 cm] (Sample input: 2 feet 7 inch Sample output: 78.74 cm)	10	4	3
	b.	Write a program to print number of days in a month. Example: Input: March Output: 31	10	4	3

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Course Code: SOE-B-CSE101

O P JINDAL UNIVERSITY

B.Tech I Semester Regular Examinations

Calculus for Computer Science

(Offered to CSE)

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

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
Unit-I					
1	a.	Test for limit of the function $\lim_{x\to 0}\frac{x+\lvert x\rvert}{x}$ at x=o AND $f(x)=x.\sin\frac{1}{x}$ at x=0	10	CO 2	K2
	b.	Check the continuity of the given function $f(x)=\begin{cases}x^2, when\ x\neq 0\\ 2, \ when\ x=0\end{cases}$ AND $f(x)=\begin{cases}\frac{\sin 2x}{x}, when\ x\neq 0\\ 1 \quad , when\ x=0\end{cases}$.	10	CO 2	K2
		OR			
2	a.	State and Prove Mean value Theorem.	10	CO 2	K3
	b.	Write series expansion of $\log(1+x)$ AND expand $\sin x$ in power of $(x-\frac{\pi}{2})$.	10	CO 2	K2
Unit-II					
3	a.	Show that $\lim_{n\to\infty}\frac{(3n^2+n)}{(5n^2-4)}=\frac{3}{5}$ AND $\lim_{n\to\infty}\frac{(n^5+\log n^2)}{7n^6}=0$	10	CO 1	K2
	b.	Check convergence or divergence of the Sequence $\{a_n\}=\frac{(2n+1)}{(2n+3)}$ AND $\{a_n\}=\{n^{\frac{1}{n}}\}$	10	CO 1	K3
		OR			
4	a.	Test the convergence or divergence of the series $\sum_{n=1}^{\infty}(\sqrt{n^4+1}-\sqrt{n^4-1})$ AND$\sum\frac{1}{n}.\sin\frac{1}{n}$.	10	CO 1	K3
	b.	Test the convergence or divergence of the series $\frac{x}{1.2}+\frac{x^2}{2.3}+\frac{x^3}{3.4}+\frac{x^4}{4.5}+\cdots$ x>0 AND $\sum\frac{n^{n^2}}{(n+1)^{n^2}}$.	10	CO 1	K3
Unit-III					

5	a.	Find the minimum value of $u=x^2+y^2+z^2$ having given ax+by+cz=p AND obtain Taylor's formula for the function e^{x+y} at (0, 0) for n=3.	10	**CO 3**	K3
	b.	By using ε-δ method prove that $\lim_{(x,y)\to(2,3)} xy=6$. AND Discuss the maximum or minimum value of $f(x,y)=x^3y^2(1-x-y)$.	10	**CO 3**	K2
		OR			
6	a.	If f(x,y) $=2x^2-xy+2y^2$, find $f_x(1,2)$ and $f_y(1,2)$ AND Expand the function $f(x,y)=x^3+3x^2y+4xy^2+y^3$ by Taylor's theorem in powers of (x-1) and (y-1).	10	**CO 3**	K3
	b.	Find the maxima and minima value of $u=x^2+y^2+z^2$ having given $ax^2+by^2+cz^2=1$ AND Expand $f(x,y)=x^2y+3y-2$ by Taylor's theorem in powers of (x-1) and (y+2).	10	**CO 3**	K3
		Unit-IV			
7	a.	Change of order of integration of $\int_0^1\int_{e^x}^{e}\frac{1}{\log y}\,dx\,dy$.	10	**CO 4**	K3
	b.	Evaluate $\int_0^3\int_0^2\int_0^1 (x+y+z)\,dx\,dy\,dz$ And also find the Volume of the Sphere using Triple Integration.	10	**CO 4**	K3
		OR			
8	a.	*Find the value of* $\iiint e^{x+y+z}\,dxdydz$. over the positive quadrant where $x+y+z\le 1$. AND Evaluate $\int_0^1\int_{x^2}^{x}\int_0^{xy} dx\,dy\,dz$.	10	**CO 4**	K3
	b.	Find the intersecting bounded area of two parabolas $y^2=4ax$ *and* $x^2=4ay$ using Double Integration. AND Evaluate $\int_{-c}^{c}\int_{-b}^{b}\int_{-a}^{a}(x^2+y^2+z^2)\,dz\,dy\,dx$.	10	**CO 4**	K3
		UNIT-V			
9	a.	What is the directional derivative of $\phi=xy^2+yz^3$ at the point (2,−1,1) in the direction of the normal to the surface $x\log z-y^2=-4$ at (−1,2,1)?	10	**CO 5**	K3
	b.	Given the vector field $\vec{V}=(x^2-y^2+2xz)\hat{i}+(xy-xy+yz)\hat{j}+(z^2+x^2)\hat{k}$. Find Div $\vec{V}$ and Curl $\vec{V}$ at (1, 2,-3).	10	**CO 5**	K2

		OR			
10	a.	Evaluate $\int_C [(x^2 - xy)dx + (x^2 + y^2)dy]$, where C is the square formed by the lines $x = \pm 1$ and $y = \pm 1$.	10	**CO 5**	K3
	b.	If $\vec{F} = (5xy - 6x^2)I + (2y - 4x)J$, evaluate $\int_C \vec{F}\, \vec{dR}$ along the curve C in the xy plane $y = x^3$ from the point (1,1) to (2,8).	10	**CO 5**	K3

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07/02/23

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Course Code: SOE-B-CSE103

O P JINDAL UNIVERSITY

I B. Tech. I Semester Regular Examinations

ELEMENTS OF COMPUTING

(Branch CSE)

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.	Define *'Avg. Access time '* and *'page fault'*.	2	CO1	K1
	b.	Define the concept of *Hit* and *Miss* in the cache memory	2	CO1	K1
	c.	What is Process?	2	CO2	K1
	d.	What do you mean by Real Time operating system?	2	CO1	K1
	e.	What are the radix (base) of binary ,octal, decimal and hexadecimal number system.	2	CO3	K1
	f.	Describe special purpose register? Mention any two of them along with the purpose.	2	CO1	K1
	g.	Define starvation and how aging can solve this issue.	2	CO2	K1
	h.	What is Edge computing?	2	CO4	K1
	i.	What is patent? What is the duration of a patent?	2	CO5	K1
	j.	Differentiate between NLU and NLG	2	CO4	K1
Section-B: Unit-I					
2	a.	Perform the following number system conversion operations: (i) 1010110_2 to HEX (ii) $2FB_{16}$ to Octal (iii) 127.54_8 to Decimal (iv) 11101.0101_2 to Decimal	10	CO3	K3
	b.	Discuss the evolution of computers (according to the generations).	10	CO1	K1
OR					
3	a.	Explain the Von -Neumann Architecture o in details.	10	CO1	K3
	b.	What do you mean by addressing mode? Explain any 06 of them along with the proper definition and formula.	10	CO2	K2
Unit-II					
4	a.	consider a disk pack with the following specifications- 16 surfaces, 128 tracks per surface, 256 sectors per track and 512 bytes per sector. Answer the following questions- 1. What is the capacity of disk pack? 2. If the format overhead is 32 bytes per sector, what is the formatted disk space?	10	CO1	K3

		3. If the diameter of innermost track is 21 cm with 2 KB/cm, what is the capacity of one track? 4. If the disk system has rotational speed of 3000 RPM, what is the average access time with a seek time of 11.5 msec?			
	b.	Solve the following problems. a) How many 128*8 RAM chips are needed to provide a memory capacity of 2048 bytes? b) How many lines of the address bus must be used to access 2048 bytes of memory? c) How many of this line are common to all chips? d) How many lines must be decoded for chip select? Specify the size of the decoder.	10	CO1	K3
		OR			
5	a.	An address space is specified by 32 bits & corresponding memory space by 24 bits. a) How many words are there in address space? (2) b) How many words are there in memory space? (2) c) If a page consists of 4K words, how many pages and blocks are there in the system? (6)	10	CO1	K3
	b.	The logical address spaces in a computer system consist of 128 segments. Each segment can have up to 32 pages of 4K words in each. Physical memory consist of 4K blocks of 4K words in each. Formulate the logical & physical address formats.	10	CO1	K3
		Unit-III			
6	a.	Explain Process State Transition and discuss about PCB in detail.	10	CO2	K2
	b.	Consider following processes and calculate their completion time, turnaround time and waiting time using First Come First Serve algorithm. **P.No.** / **Arrival Time** / **Burst Time** P1 0 8 P2 0 6 P3 1 4 P4 2 2 P5 3 5	10	CO2	K3

		P6 4 1 P7 5 3			
OR					
7	a.	Consider following processes and calculate their completion time, turnaround time and waiting time using Shortest Job First algorithm. **P.No. / Arrival Time / Burst Time** P1 0 4 P2 0 3 P3 1 1 P4 2 2 P5 3 3 P6 4 5	10	CO2	K3
	b.	What do you mean by Multiprogramming, Multi-tasking and multithreading operating system, Describe the task performed by operating system in details .	10	CO2	K1
Unit-IV					
8	a.	What is patent? Discuss about inventions that are patentable and that are non-patentable.	10	CO4, CO5	K2
	b.	Why plagiarism is so bad? Discuss different ways to avoid it. Describe citation in detail.	10	CO4, CO5	K3
OR					
9	a.	What is plagiarism? What are different types of it? Discuss in detail.	10	CO4, CO5	K2
	b.	Describe various phases of NLP and discuss different applications of NLP.	10	CO4, CO5	K2

Program Code: 01UG020

O P JINDAL UNIVERSITY

B. Tech. I Semester Regular Examinations

Emerging Technologies – I

(Subject Code: SOE-B-CSE104)

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 Data Mining?	2	1	1
	b.	Define Edge Computing.	2	1	1
	c.	What do you Understand by Super-Position?	2	2	1
	d.	Why Quantum is call future technology?	2	2	1
	e.	What is AR & VR?	2	4	1
	f.	What are the principal of 3D Printing?	2	5	1
	g.	Define Phishing.	2	3	1
	h.	What is Map Reduce?	2	1	1
	i.	Define Deep Learning.	2	2	1
	j.	What is Natural Language Processing in AI?	2	2	1
Section-B: Unit-I					
2	a.	Explain 5V's of Big Data.	10	1	2
	b.	Classify the type of Data Analytics.	10	1	2
OR					
3	a.	Compare The Supervised & Unsupervised Model with Examples.	10	1	3
	b.	Explain the Subfields of Artificial Intelligence.	10	1	2
Unit-II					
4	a.	Deployment & Service Model in Cloud Computing.	10	2	2
	b.	What is the future of Edge Computing & Its Implementation Challenges?	10	2	2
OR					
5	a.	Describe Entanglement & Superposition.	10	2	2
	b.	Explain Type of Cyber Attacks.	10	2	2
Unit-III					
6	a.	Define Evolution & Feature of 5G Technology.	10	3	2
	b.	How does the Augmented Reality work Give the Application of AR.	10	3	2
OR					
7	a.	What are the Issues addresses by AR & VR?	10	3	2
	b.	Explain the challenges & application of VR.	10	3	2

Unit-IV					
8	a.	Explain 4 types of Additive Manufacturing Model.	10	4	2
	b.	Explain Six steps in Conventional Design Process & Reason to Implement CAD System.	10	4	2
OR					
9	a.	Describe Following Points : • Geometric Modeling • Engineering Analysis • Design Review & Evolution • Automated Drafting • CAD Hardware	10	4	2
	b.	What are the Advantages & Dis-Advantages of Additive Manufacturing?	10	4	2

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Course Code: 01UG020

O P JINDAL UNIVERSITY

B.Tech Ist Semester Regular Examinations

Digital System Design

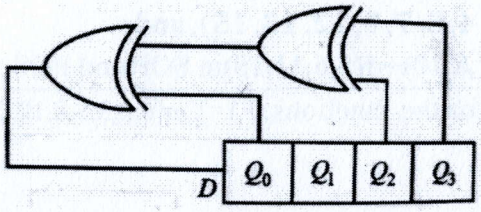
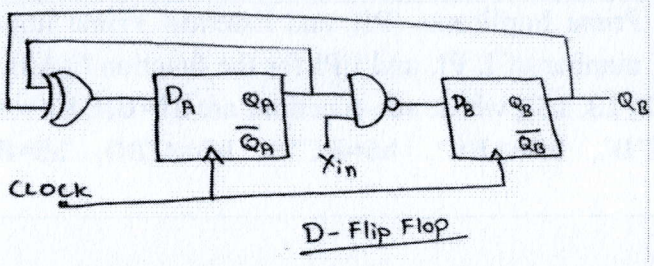
Computer Science Engineering

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.	Explain R's and (R-1)'s complement and perform both operations on $(65)_{10}$-$(74)_{10}$ and $(1010)_2$-$(1100)_2$.	10	CO 1	KL3
	b.	Find radix. **(235) $_{R1}$= 565 = (865) $_{R2}$**	10	CO 1	KL3
OR					
2	a.	Convert the Hexa-decimal number **$(1E8.7)_{16}$** to a binary, octal, decimal, and base 7 number system.	10	CO 1	KL3
	b.	Explain the error detection code with examples. Construct an even parity seven-bit Hamming code to transmit the data for 1110 and 0101, and locate the error for 1111001.	10	CO 1	KL2
Unit-II					
3	a.	Solve by using k-map for the function **$F_1(A,B,C,D)= \sum m(1,2,3,4,5,7,9,12,13,15)$, and $F2(A,B,C,D)=\sum m(0,1,2,3,7,8,10)+d(5,6,11,15)$** in SOP and POS form.	10	CO 4	KL3
	b.	Find number of PI and EPI for the functions, F1=∑m(0,2,3,5,8,10,13,15), F2=∑m (2,3,4,5) F3=∑m(0,2,4,5,6,10), F4=A'C+AC'+B'C, F5=WY+XY+W'XYZ+W'X'Y+XZ+X'Y'Z', and **F6=∑m(1,3,6,7), Find redundant PI for function F6.**	10	CO 1	KL3
OR					
4	a.	State Implicants (I), Prime Implicants (PI), and Essential Prime Implicants (EPI). List down the number of I, PI, and EPI for the function F(A,B,C,D)= **$\sum m(1,5,7,8,10,12,13,15)$,** whose sub-functions are **h1=BD, h2 =A'C'D, h3=AB'D', h4=AC'D', h5=ABC', h6=BC'D, h7=A'BD, h8=BC'D', h9=A'B'C'.**	10	CO 1	KL3
	b.	Solve the following: i) A⊕B⊕C ii) A⊙B⊙C iii) A⊙ (A'+B) iv) A⊕ (A'+B)	10	CO 1	KL 3

Unit-III					
5	a.	Design half-adder and full-adder circuits using logic gates then design with a decoder or with a multiplexer.	10	CO 4	KL 6
	b.	Implement the function F=∑m(0,1,3,4,7,8,9,11,14,15) using 16:1, 8:1, 4:1 and 2:1 multiplexer.	10	CO 4	KL6
OR					
6	a.	Write advantages and disadvantages of Mux, Demux, Encoder, and Decoder	10	CO 1	KL 1
	b.	Design a 2-bit magnitude comparator circuit.	10	CO 4	KL3
Unit-IV					
7	a.	Explain the SR flip-flop and show how the JK flip-flop can be operated as a toggle flip-flop.	10	CO 1	KL2
	b.	Write the difference between: (i) Synchronous and Asynchronous counter, and (ii) Sequential and Combinational circuit.	10	CO 1	KL2
OR					
8	a.	Explain registers with its application. A 4-bit shift register, which shifts one bit to the right at every clock pulse, is initialized to value (1000) for (Q0,Q1,Q2,Q3). The D input is derived from Q_0, Q_2, Q_3 through two XOR gates as shown below. After how many clock pulses the initial pattern appears. 	10	CO 4	KL4
	b.	A Finite State Machine (FSM) is implemented using D-flip-flop A and B with logic gates as shown in the figure below. The four possible states of FSM are Q_AQ_B=00,01,10,11  D- Flip Flop Assume that Xin is held at a constant logic level throughout the operation of the FSM, when the FSM is initialized to the state Q_AQ_B=00 and clocked after a few clock cycle. Draw state diagram. ***(NOTE: Solve when (i) Xin=0, and (ii) Xin=1)***	10	CO 4	KL4

		UNIT-V			
9	a.	What are Programmable Logic Devices and illustrate any three of them?	10	CO 1	KL2
	b.	Implement NAND and NOR functions with any one of the following MOS families: i) PMOS and CMOS. ii) NMOS and CMOS.	10	CO 4	KL3
		OR			
10	a.	Implement the following functions with the help of Resistor Transistor Logic (RTL). (i) F1= $\overline{A+B+C}$ (ii) F2= $\overline{A.B.C}$ (iii) F3=$\overline{AB+C}$ (iv) F4=$\overline{(A+B).(C+D)}$	10	CO 4	KL3
	b.	Write advantages and disadvantages of any three major logic families. (TTL, ECL, NMOS and CMOS).	10	CO 1	KL2