SHRI SHANKARACHARYA INSTITUTE OF PROFESSIONAL MANAGEMENT AND TECHNOLOGY RAIPUR

DEPARTMENT OF MATHEMATICS (Civil Engg)

Class Test – II	Session- July – Dec 2022	Month- February
Semester- B.Tech-III	Subject- Mathematics-III	
Code – B000311(014)	Time Allowed: 2 hrs	Max Marks: 40

Note: - 1) Attempt any TWO from unit IV
2) Attempt any THREE from unit V ,Use atleast 4 decimal places for numerical solution

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO
	Unit – IV			
1.A	Using Lagrange's interpolation formula find f (9) x: 5, 7, 11, 13, 17 f(x): 150, 392, 1452, 2366, 5202	**8**	Applying	CO4
1.B	Using Stirling's formula estimate tan 16 θ: 0, 5, 10, 15, 20, 25, 30 tan θ: 0, 0.0875, 0.1763, 0.2679, 0.3640, 0.4663, 0.5774	**8**	Applying	CO4
1.C	Using Newton's divided difference formula ,evaluate f(9) & f(15) x: 4, 5, 7, 10, 11, 13 f(x): 48, 100, 294, 900, 1210, 2028	**8**	Applying	CO4
	Unit – V			
2.A	Solve dy/dx =x+y ,y(0) = 1 by Taylors series method. Hence find the value of y at x = 0.1 and x = 0.2	**8**	Evaluating	CO5
2.B	Solve the following differential equation by using modified Eulers method $\frac{dy}{dx} = x + \lvert\sqrt{y}\rvert$,y(0) = 1 at $0 \le x \le 0.4$ with h = 0.2	**8**	Evaluating	CO5
2.C	Apply Runge – Kutta method of fourth order to approximate the value of y at x = 0.2 in steps of 0.1 if $\frac{dy}{dx} = x + y^2$ given that y = 1 when x = 0	**8**	Applying	CO5
2.D	Find the Laplace transform of a) $(e^{-t}\sin t)t$ b) $(\sqrt{t} - \frac{1}{\sqrt{t}})^3$	**8**	Applying	CO5

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Department of Civil Engineering

Class Test – II | **Session: July – Dec, 2022** | **Month – February**

Semester – 3rd | **Subject – Building Material,** | **Code – B020315 (020)**

Time Allowed: 2 hrs | **Max Marks: 40**

Note: - Part (a) from each question is compulsory attempt any 2 from b, c, & d from each part.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	COs
	Part- I			
(a)	1. Which of the following is not a vehicle in paints? a. Linseed oil b. Poppy oil c. Turpentine oil d. Tung oil 2. In fire proof paints, the main constituent is a. Aluminum powder b. Red lead c. Copper powder d. Asbestos Fibers	[4]	Understand	CO4
(b)	Discuss the classification of bitumen & its Uses	[8]	Understand	CO4
(c)	Explain the composition of oil paint & their function	[8]	Understand	CO4
(d)	Discuss in brief any one method of preservation of timber	[8]	Understand	CO3
	Part- II			
(a)	1. The grade of wood tar used for grouting purposes is a. RT-1 b. RT-2 c. RT-4 d. RT-5 2. Petroleum bitumen is obtained from a. fractional distillation b. extraction c. atmospheric-vacuum distillation d. destructive distillation	[4]	Understand	CO4
(b)	Which waste material can be used in building & construction	[8]	Understand	CO3
(c)	Draw a cross section of exogenous tree showing its different components differentiate between medullary rays & cambium layer.	[8]	Understand	CO3
(d)	Write short notes on : Low cost material Ply wood Particle of wood	[8]	Understand	CO3

Shri Shankaracharya Institute of Professional Management & Technology,Raipur

Department of Civil Engineering

Class Test – II

SSIPMT

Session: July-December, 2022 | **Month –February**

Semester – 3rd (B-Tech) | **Subject – IFM** | **Code – B000312 (020)**

Time Allowed: 2 hrs. | **Max Marks: 40**

Note: - In Part I & II, Question A is compulsory and attempt any two from B, C & D.

Q. No.	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part I			
A.	Define the following Pitot tube, Orifice meter, Momentum Equation	[4]	Understand	CO3
B.	Derive Euler's equation of motion along a stream line for an ideal fluid stating clearly the assumption. Derive also Bernoulli's equation from Euler's equation.	[8]	Apply	CO3
C.	What is Venturimeter? Derive an expression for the discharge through a Venturimeter.	[8]	Apply	CO3
D.	250 litres /s of water is flowing in a pipe having a diameter of 300mm. If the pipe is bent by 135° (that is change from initial to final direction is 135°), find the magnitude and direction of the resultant force on the bend. The pressure of the water flowing is 39.24 N/cm2.	[8]	Apply	CO3
	Part II			
A.	Define the following Stream line, Velocity Potential function, Streak line	[4]	Understand	CO2
B.	The Stream function for a two-dimensional flow is given by $\psi = 2xy$, calculate the velocity at the point P (2, 3). Find the velocity potential function.	[8]	Apply	CO2
C.	Obtain the condition for a trapezoidal channel with side slopes 2H: 1V to be most efficient for a given area A. let b be its bed width.	[8]	Apply	CO4
D.	Find the bed slope of trapezoidal channel of bed width 6m, depth of water 3m and side slope of 3H:4V, when the discharge through the channel is $30 m^3/s$. Take C = 70	[8]	Understand	CO4

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Department of Civil Engineering

Class Test – II Session- July-Dec, 2022 Month-February

Sem- 3rd **Subject- Plane Surveying – I** **Code- B020314(020)**

Time Allowed: 2 hrs Max Marks: 40

Note: - Question Q1 and Q2 are compulsory. Attempt any 2 questins from Q3, Q4 and Q5.

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs
	PART-I			
Q1	Explain the term latitude and departure in traversing.	[4]	Understanding	CO4
Q3	Explain the method of Repetition for setting out horizontal angle.	[8]	Understanding	CO3
Q4	Name the common methods of balancing the traverse. How is a closing error in a traverse balanced?	[8]	Understanding	CO4
Q5	Compute the length CD for a traverse if A, D and E are point on straight line	[8]	Applying	CO4
	PART-II			
Q1	Define the degree of curvature.	[4]	Understanding	CO5
Q2	Explain the elements of a simple circular curve. Give their relationship.	[8]	Understanding	CO5
Q3	Calculate the necessary data for setting out a circular curve with the following data. The angle of intersection = 140^0, chainage point of intersection = 1440m, and the radius of curve =300m. The curve is to be set out by the offsets from the chord produce with pegs at every 20m of through chainage.	[8]	Applying	CO5
Q4	Two tangents intersect at a chainage 3450m.the angle of deflection is 50^0. Calculate all data necessary for setting out a curve of radius 250m by the deflection angle method (Rankin's method). The peg interval may be taken as 20m.	[8]	Applying	CO5

Line	Length(m)	Bearing(degree)
AB	90	85
BC	150	32
CD	?	350
DE	182	18

Shri Shankaracharya Institute of Professional Management & Technology, Raipur

Department of Civil Engineering

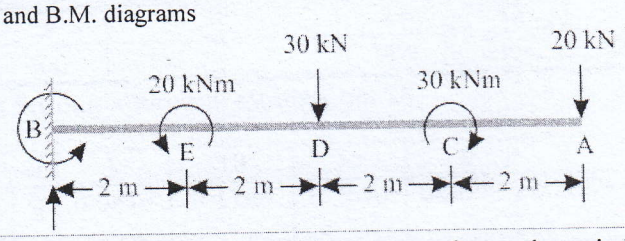
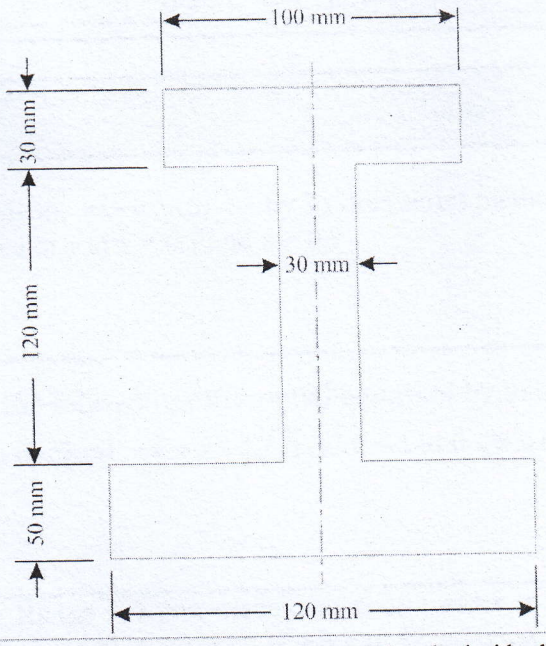
SSIPMT

Class Test – II Session: NOV – DEC, 2022 Month – FEBRUARY

Semester – 3rd Subject – Introduction to Solid Mechanics Code – B020313(020)

Time Allowed: 2 hrs. Max Marks: 40

Note: - Part A of each question is compulsory. Attempt any 2 from Part B, C & D in each question.

Q. No	Questions	Marks	Levels of Bloom's taxonomy	CO's
	Part-I			
A.	Define point of contraflexure.	[4]	Understand	CO3
B.	Find the reaction at the fixed end of the cantilever loaded as shown in Fig.4.18 (a). Draw also the S.F. and B.M. diagrams 	[8]	Analyze	CO3
C.	A beam simply supported at ends and having cross-section as shown in Fig. below is loaded with a U.D.L., over whole of its span. If the beam is 8 m long, find the U.D.L. if maximum permissible bending stress in tension is limited to 30 MN/m2 and in compression to 45 MN/m2. What are the actual maximum bending stresses set up in the section? 	[8]	Analyze	CO3
D.	A hollow circular bar having outside diameter twice the inside diameter is used as a beam. From the bending moment diagram of the beam, it is found that the bar is subjected to a bending moment of 40 kNm. If the allowable bending stress in the beam is to be limited to 100 MN/m2, find the inside diameter of the bar.	[8]	Analyze	CO3
	Part-II			
A.	Write the assumption of Euler theory	[4]	Understand	CO4

B.	A slender pin ended aluminium column 1.8 m long and of circular crosssection is to have an outside diameter of 50 mm. Calculate the necessary internal diameter to prevent failure by buckling if the actual load applied is 13·6 kN and the critical load applied is twice the actual load. Take E for aluminium as 70 GN/m2.	[8]	Analyze	CO4
C.	A 1·5 m long C.I. column has a circular cross-section of 5 cm diameter. One end of the column is fixed in direction and position and the other is free. Taking factor of safety as 3, calculate the safe load, using: (i) Rankine-Gordon formula; take yield stress 560 MN/m2, and 1 a = 1600 for pinned ends. (ii) Euler's formula. Young's modulus for C.I. = 120 GN/m2	[8]	Analyze	CO4
D.	Compare the crippling loads given by Rankine's and Euler's formulae for tubular strut 2·25 m long having outer and inner diameters of 37·5 mm and 32·5 mm loaded through pin-joint at both ends. Take: Yield stress as 315 MN/m2; , 1 2 a = and E = 200 GN/m . 7500 If elastic limit for the material is taken as 200 MN/m2, then for what length of the strut does the Euler formula cease to apply?	[8].	Analyze	CO4