

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: MTECH & PRE_PHD
BRANCH: Mechanical**

**SEMESTER : IInd / NA
SESSION : SP/2023**

SUBJECT: ME502 ADVANCED COMPUTER AIDED DESIGN

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Show that transformation matrix for a reflection about the line $Y = +X$ is equivalent to a reflection relative to the X-axis, followed by a counter clockwise rotation of 90° .	[5]	CO3	BL L3
Q.1(b)	Explain IGES, PDES and DXF data exchange format.	[5]	CO2	L2
Q.2(a)	Explain in detail the difference between the surface modelling and solid modelling.	[5]	CO1	L1
Q.2(b)	Explain the constructive solid geometry (C-rep) and Boundary representation (B-rep) with examples.	[5]	CO2	L2
Q.3(a)	Explain NURBS.	[5]	CO2	L2
Q.3(b)	Derive an expression of Bezier curve in terms of blending functions. Also draw the curves of blending functions.	[5]	CO3	L3
Q.4(a)	Explain the principles and approaches of collaborative design.	[5]	CO2	L2
Q.4(b)	Explain briefly the steps involved in designing of animation sequences with examples.	[5]	CO3	L2
Q.5(a)	Determine the diameter of a solid steel shaft to transmit 20 kW at 200 rpm. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameters is 0.5.	[5]	CO3	L3
Q.5(b)	Write a program for the problem 5(a).	[5]	CO3	L3

:24/04/2023:E