K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Nov – Dec 2024
(B. Tech) Program: EXTC Scheme I/II/IIB/III: II
Regular Examination: SY Semester: VII
Course Code: EXDLC7043 and Course Name: Robotics
Date of Exam: 23/11/2024 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Define Following 1) Accuracy 2) Precision 3) repeatability		1	U
b)	Find a Composite Rotation Matrix for robots if its Mobile coordinate frame is rotated by angle 30 degree about f1, 60 degree about f2 and 30 degree about f3.		4	Ap
c)	What are heading sensors? Explain utility of this sensor in Mobile Robotics		3	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Explain on off controller in the operation of controlling speed of motor.		2	U
b)	Explain challenges in localization of Sensor aliasing and effector noise.		5	U
c)	Write a short note on Architecture for behavior-based Navigation		6	U
Q. 3	Solve any two questions out of three: (10 marks each)			
a)	Find out expression for ${}^{B}_{C}T$	20		Ap

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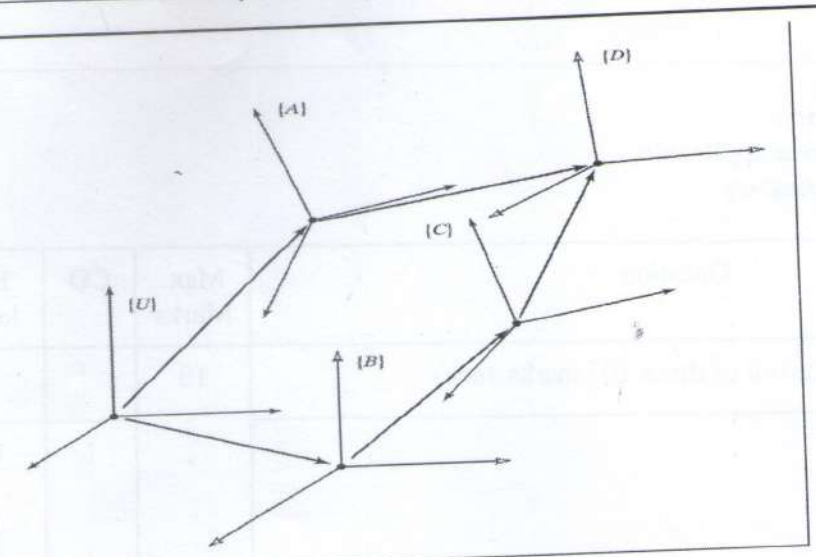
a)			4	
b)	Define Following 1) Homogeneous Transformation Matrix and 2) Inverse Homogeneous Transformation matfix 3) Accuracy and Precision 5		1	U
c)	Explain BLDC motor control techniques.		2	U
Q.4	Solve any two questions out of three: (10 marks each)	20		
a)	Explain PID controller and write a Pseudo code for PID controller.		3	U
b)	Compare Bug-1 and Bug-2 algorithm.		5	U
c)	Describe Subsumption architecture of level 2 with example.		6	U

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