

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VII

Course Code: ELXDLO7033 and Course Name: Robotics

Time: 1 hour

Max. Marks: 50

=====

Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	_____ of a robotic manipulator is a measure of the ability of the robot to place the tool tip at an arbitrarily prescribed location in the work envelope.
Option A:	Precision
Option B:	Stroke
Option C:	Accuracy
Option D:	Repeatability
Q2.	_____ is the maximum distance a robot can reach with in its work envelope.
Option A:	Precision
Option B:	Stroke
Option C:	Accuracy
Option D:	Reach
Q3.	Which option is a characteristic of forward kinematics
Option A:	easy to solve
Option B:	existence of multiple solution
Option C:	Singularities
Option D:	Possible non existence of a solution
Q4.	A point p is attached to a frame F_{noa} and is subjected to the following transformations. Select the correct sequence of matrix multiplication. 1. Rotation of 90° about the o-axis, 2. Followed by a rotation of 90° about the n-axis, 3. Followed by a translation of $[4, -3, 7]$ along n-,o-,a axis.
Option A:	$Trans(4,-3,7)Rot(n,90)Rot(o,90)$
Option B:	$Trans(4,-3,7)Rot(o,90)Rot(n,90)$
Option C:	$Rot(n,90)Rot(o,90)Trans(4,-3,7)$
Option D:	$Rot(o,90)Rot(n,90)Trans(4,-3,7)$
Q5.	To place the origin of the hand frame of a cylindrical robot at $[4,3,8]^T$. Calculate the joint variables of the robot.
Option A:	$r=5, l=8, \alpha=53.1^\circ$
Option B:	$r=8, l=5, \alpha=23.86^\circ$
Option C:	$r=5, l=8, \alpha=36.86^\circ$
Option D:	$r=8, l=5, \alpha=43.1^\circ$

Q6.	Which parameter represents length of common normal between two successive z-axis in DH representation?
Option A:	Theta
Option B:	Alpha
Option C:	D
Option D:	A
Q7.	Which parameter represents translational length to make two successive x-axis collinear in DH representation?
Option A:	Theta
Option B:	Alpha
Option C:	D
Option D:	A
Q8.	_____ can be calculated by taking the derivatives of each position equation with respect to all variables.
Option A:	Lagrangian
Option B:	Jacobian
Option C:	Euler
Option D:	Newton
Q9.	A frame B has translated a differential amount of Trans[0.01,0.05,0.03] units. What will be its new orientation.
Option A:	It is same
Option B:	It changes differentially
Option C:	It changes
Option D:	Cant say
Q10.	With _____ we can calculate how fast each joint must move, such that the robot's hand will yield a desired differential motion or velocity.
Option A:	Jacobian
Option B:	Inverse of Jacobian
Option C:	Langrangian
Option D:	Euler
Q11.	A lagrangian is defined as
Option A:	Kinetic energy of the system – potential energy of the system
Option B:	Potential energy of the system – kinetic energy of the system
Option C:	Kinetic energy of the system – momentum of the system
Option D:	momentum of the system – potential energy of the system
Q12.	The link velocities and accelerations are used to compute the forces and moments acting on each link starting at the tool and -working to the base. These are the _____ equations.
Option A:	Lagrangian

Option B:	Backward Newton Euler
Option C:	Inverse Jacobian
Option D:	Forward Newton Euler
Q13.	The description of the motion to be made by the robot by its joint values is called_____
Option A:	Trajectory
Option B:	Cartesian space description
Option C:	Joint space description
Option D:	Path
Q14.	The motion between the two points might result in singularities, in case of
Option A:	Trajectory
Option B:	Cartesian space description
Option C:	Joint space description
Option D:	Path
Q15.	If the unit of storage is one byte per pixel, then a single frame of a 1024 x 1024 pixel image uses _____ megabyte of memory.
Option A:	1
Option B:	2
Option C:	3
Option D:	4
Q16.	The ratio of the pixel spacing in the x direction to the pixel spacing in the y direction is called the _____ of image
Option A:	Directional ratio
Option B:	Aspect ratio
Option C:	Drop ratio
Option D:	Axial ratio
Q17.	Analog image is converted to digital by performing
Option A:	Filtering
Option B:	Sampling and quantization
Option C:	Noise removal
Option D:	Edge detection
Q18.	Descriptors based on an analysis of points enclosed by the boundary are called__
Option A:	Line descriptors
Option B:	Area descriptors
Option C:	Volume descriptors
Option D:	Angle descriptors
Q19.	A compression technique for binary images is to employ a simple encoding scheme called_____
Option A:	Binary encoding

Option B:	Edge encoding
Option C:	Corner encoding
Option D:	Run length encoding
Q20.	To remove both the salt and the pepper, and to smooth out jagged edges in general, it is often effective to use _____
Option A:	Descriptions
Option B:	Swell operation
Option C:	Shrink operation
Option D:	Both shrink and swell operation
Q21.	_____ of an image is the number of parts minus the number of holes.
Option A:	Run length encoding
Option B:	Euler number
Option C:	Line descriptors
Option D:	Area descriptors
Q22.	_____ is the key to using robot vision to plan the motion of a robotic arm.
Option A:	Inverse Perspective transformation
Option B:	Perspective transformation
Option C:	Swell operation
Option D:	Shrink operation
Q23.	_____ in free space is a locus of points which are equidistant from two or more obstacle boundaries.
Option A:	GMP
Option B:	GVD
Option C:	GSD
Option D:	GDP
Q24.	dx , dy , and dz in $[D]$ represent the
Option A:	differential motions of the hand along the x -, y -, and z -axes,
Option B:	differential rotations of the hand around the x -, y -, and z -axes
Option C:	differential motions of the hand along the n -, o -, and a -axes,
Option D:	differential rotations of the hand around the n -, o -, and a -axes
Q25.	The order of multiplication for differential rotations is
Option A:	Pre-multiplication
Option B:	Not important
Option C:	Post-multiplication
Option D:	Very important