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**Question Paper Code: 99375**

B.E./B.Tech. DEGREE EXAMINATION, DEC 2021

Open elective

Civil Engineering

19UEE975 -PRINCIPLES OF ROBOTICS

(Common to CSE, ECE, MECH, EIE , IT and Chemical Engineering)

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- 1 Drives are also known as  
(a) Actuators (b) Controller (c) Sensors (d) Manipulator CO1-U
- 2 The Robot designed with Cartesian coordinate systems has  
(a) Three linear movements CO1-U  
(b) Three rotational movements  
(c) Two linear and one rotational movement  
(d) Two rotational and one linear movement
- 3 Variable speed drive is a piece of equipment that regulates the  
(a) speed (b) rotational force (c) torque (d) all the above CO2-U
- 4 The Horsepower of motor which has RPM and Torque is 3000 & 6 in-lbf respectively is \_\_\_\_\_ CO2-App  
(a) 0.286 (b) 1.2 (c) 2800 (d) none of these
- 5 Which of the following terms IS NOT one of the five basic parts of a robot? CO3-U  
(a) Peripheral tools (b) end effectors (c) controller (d) drive
- 6 For a robot unit to be considered a functional industrial robot, typically, how many degrees of freedom would the robot have? CO3-U  
(a) three (b) four (c) six (d) eight

- 7 How can less work be done using pulleys?  
 (a) Increase the height of the pulley  
 (b) Add stronger rope or string  
 (c) Add more pulleys  
 (d) Remove pulleys
- 8 A sensor used in path determination robot  
 (a) ultrasonic sensor (b) IR sensor (c) proximity sensor (d) echo sensor
- 9 Which of the following places would be LEAST likely to include operational robots?  
 (a) warehouse (b) factory (c) hospitals (d) private homes
- 10 Automation with little human touch is known as  
 (a) Automation (b) Automation (c) Semi worker (d) Manual work
- PART-B(5X 2= 10 Marks)
- 11 Define Robotics.
- 12 Analyze the difference between electronic and pneumatic manipulators.
- 13 What is application of machine vision system?
- 14 Distinguish Kinematics and Dynamics.
- 15 Explain about path planning?
- PART -- B ( 5 X 16 = 80 Marks)
- 16 (a) (i) Briefly describe the Robotic Systems with a neat sketch.  
 (ii) Describe Asimov's laws of Robotics.
- Or
- (b) Classify robots according to their co-ordinates with necessary diagrams.
- 17 (a) Compare hydraulic, pneumatic and electrical drives. Sketch and explain pneumatic actuators.
- Or
- (b) Explain in details about DC PPMC motor and Brushless DC motor with a neat sketch

CO4-U

CO4-U

CO5-U

CO5-R

CO1-U

CO2-Ana

CO3-U

CO4-Ana

CO5-U

10 CO1-U

6 CO1-U

16 CO1-Ana

16 CO2-Ana

16 CO2-U

18	(a)	Explain the different stages of machine vision system and its types of illumination system.	16	CO3-U
Or				
	(b)	(i) Discuss in detail about Proximity sensors and Touch sensors.	8	CO3-U
		(ii) Illustrate the working of Tachogenerators and position sensor.	8	CO3-U
19	(a)	Illustrate in detail the forward and inverse problem of manipulator kinematics in robots.	16	CO4-C
Or				
	(b)	Discuss in details about Homogeneous Transformations for the manipulator.	16	CO4-U
20	(a)	Discuss in details about Block Diagram of Robot control System & motion control.	16	CO5-U
Or				
	(b)	Explain in details about Machine loading and unloading process using robots.	16	CO5-U

