MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
M.Tech II Year I Semester (R18) Regular End Semester Examinations – DEC 2019
INDUSTRIAL ROBOTICS

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **In Q.no 1 to 5 answer either Part A or Part B only.**

Q.1(A)	Explain the principle and purpose of following sensors (a) Tactile sensors and (b) proximity and Range sensors.	12M
	OR	
Q.1(B)	With neat diagrams explain in detail four basic types of robot configurations along with workspace.	12M
Q.2(A)	Derive forward transformation and inverse transformation of a 2 DOF arm.	12M
	OR	
Q.2(B)	What is trajectory planning? Solve the third order polynomial trajectory planning with Example.	12M
Q.3(A)	How Lagrange's equations apply to a two degree of freedom robotic system.	12M
	OR	
Q.3(B)	(i) Explain the working principle of magnetic grippers.	6M
	(ii) Explain the selection criteria for end effectors in robot.	6M
Q.4(A)	Explain the motion commands used in robot programming.	12M
	OR	
Q.4(B)	Explain the First, Second and Third generation Textual programming languages.	12M
Q.5(A)	What is a Robot Cell? Explain the various Robot Cell layouts.	12M
	OR	
Q.5(B)	Explain with neat sketch the application of robot in i) Material transfer ii) Spot welding.	6M 6M

END

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(UGC-AUTONOMOUS)
M.Tech II Year I Semester (R18) Regular End Semester Examinations – DEC 2019
DESIGN OF PRE-STRESSED CONCRETE
(Civil- Structural Engineering)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part A or Part B only.
Assume suitable data if necessary

Q.1(A)   (i) Compare characteristics of pre stressed concrete with Reinforced concrete   6M
         (ii) Explain any two methods of pre stressing systems   6M
                                        OR

Q.1(B)   A PSC beam 400 x 600 mm has span of 6 m. The beam is pre stressed with a straight   12M
         tendon having bent at center is 13.5 cm @ center. The external load on the beam
         consist of concentrated load 18 Tonne at mid span. If the effective pre stressing
         force is 120 Tonne. Estimate the extreme fibre stresses at mid span and at the end
         section using load balancing method and stress method. Neglect self weight of the
         beam.

Q.2(A)   A PSC concrete T beam supports superimposed load of 5.5 kN/m over a simply   12M
         supported span of 5 m. The flange of the beam is 400 mm wide and 50 mm deep.
         The rib is 100 mm wide and 200 mm deep. The stress in concrete should not exceed
         14 MPa compression and zero in tension at any stage. Check the adequacy of the
         section provided and estimate the minimum pre-stressing force necessary and
         corresponding eccentricity. Assume loss of pre-stressing is 16 % .
                                        OR

Q.2(B)   Describe Magnels method for end block design.   6M
         What is the stress distribution in end block? Draw.   6M

Q.3(A)   **Design** of pre-tensioned member to carry a tension of 1500 kN. Safe compressive 12M
         stress in concrete is 10.5 MPa, m = 8 and initial pre-stress in steel is 1700 MPa.
         Assume 20 % loss of pre-stress.
                                        OR

Q.3(B)   A pre-stressed concrete column is 500 mm x 500 mm and 7 m high and is provided   12M
         with 8 H.T wires of 8 mm diameter, the effective pre-stress in the wires being
         500 MPa. The column carries an axial compression load of 300 kN and is also
         subjected to transverse load of 35 kN acting at the mid height of the column.
         Determine the extreme stresses on the column section. Take m = 6 and assume the
         column to be hinged at both the ends. Cover is 50 mm.

Q.4(A)   (i) What do you mean by loss of pre-stress? What are the causes of loss in   8M
         pre- stress?
         (ii) List out the various types of losses in pre tensioning   4M

                                        OR

Q.4(B)   A pre-stressed concrete beam of span 10 m is of rectangular section, 120 mm wide   12M
and 300 mm deep, provided with parabolic cable, the initial pre-stressing force being
280 kN. The beam carries a live load of 2.20 kN/m. Evaluate the short term
deflection at the center of the span. Take E_c= 40 kN /mm^2 and creep coefficient is 2.
Loss of pre-stress is 80 % of the initial stress after duration of 6 months. Find the
long term deflections at the center. Assume that the beam is subjected to dead load
and live load simultaneously when the pre-stress is applied.

Q.5(A)   A post tensioned beam of rectangular sections has width is 100 mm and depth of   12M
200 mm. The beam with effective span of 5 m is pre-stressed by tendon with
therecentroids with bottom kern. The initial force of the tendon is 150 kN. The loss
of pre-stress may be assumed to be 15 %. The beam is incorporated in composite
T beam by casting top flange of breadth 400 mm and thickness 40 mm. If the
composite beam support live load of 8 kN/m^2. Evaluate the resultant stress
developed in the precast and in-situ cast concrete assuming the pre-tensioned beam
as un-propped by propped during the casting of the slab. Assume the same modulus
of elasticity for the concrete in the precast beam and in-situ cast slab.

OR

Q.5(B)   What is composite section of pre stressed concrete? What are the advantages and   12M
disadvantages of pre stressed composite sections?

END

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(UGC-AUTONOMOUS)
M.Tech II Year I Semester (R18) Regular End Semester Examinations – Dec'2019
(Regulations: R18)
PATTERN RECOGNITION & MACHINE LEARNING

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part-A or B only

Q.1(A)	Write Short notes on
	   i) Feature extraction
	   ii) Classification
	   iii) Post processing
		12M

	OR	
Q.1(B)	Discuss the functions of Learning and Adaptation concept.	12M
Q.2(A)	Describe about Hebbian and Perceptron Learning rules used in Neural Networks.	12M
	OR	
Q.2(B)	Note the multilayer feed forward network with relevant diagrams.	12M
Q.3(A)	List out the various functions of Support Vector Machines and mention how it is relevant to pattern classification problem.	12M
	OR	
Q.3(B)	Note the functions of Two-Category and Multi-category Case problems with an example.	12M
Q.4(A)	Write about evolutionary methods used for optimization problems.	12M
	OR	
Q.4(B)	Explain in detail about genetic algorithms.	12M
Q.5(A)	Discuss about Bias and Variance for Regression methods.	12M
	OR	
Q.5(B)	Mention about the concept of boosting in re-sampling for the design of classifier.	12M

*** END***

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(UGC-AUTONOMOUS)
M.Tech II Year I Semester (R18) Regular End Semester Examinations – Dec 2019
INDUSTRIAL SAFETY
(Common to ALL)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part A or Part B only.

Q.1(A)	Describe salient points of factories act 1948 for Health and Safety	12M
	OR	
Q.1(B)	What are the preventive steps for electrical hazards in industries? Also, list the various methods involved in fire prevention.	12M
Q.2(A)	Explain the primary and secondary functions and responsibility of maintenance department.	12M
	OR	
Q.2(B)	Why maintenance is necessary in industries? Describe the various applications of tools used for maintenance.	12M
Q.3(A)	Define corrosion. Discuss the various factors affecting corrosion.	12M
	OR	
Q.3(B)	State Lubricants-types and applications. Describe various methods for preventing corrosion and rusting.	12M
Q.4(A)	Explain the sequence of fault finding with respect to factory production line.	12M
	OR	
Q.4(B)	With suitable example explain decision tree.	12M
Q.5(A)	With suitable example explain periodic inspection-concept. List the advantage of overhauling of electrical components.	12M
	OR	
Q.5(B)	With suitable example discuss various program and schedule of preventive maintenance of mechanical equipment.	12M

END