

School of Aeronautics (Neemrana)

I-04, RIICO Industrial Area, Neemrana, Dist. Alwar, Rajasthan

Approved by Director General of Civil Aviation, Govt. of India, All India Council for Technical Education
Ministry of HRD, Govt of India & Affiliated to Rajasthan Technical University, Kota & BTU, Bikaner Rajasthan

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 53 /

Instructions For Students / Faculty Mid Term I (Total 60 Marks, 2 HRS. Syllabus From Beginning Of Session)

• Part A: Total number of questions to be given are five, each carrying 3 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For Both Question & Answer**), no objective type or fill in the blanks. Total 15 marks.

• Part B: Total number of questions to be given are six, out of which student has to answer any four. They are long answer type (**Not More Than 50 Words For Question**), each carrying 6 marks. Total 24 marks.

• Part C: Total number of questions to be given are four, out of which student has to answer any three. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 7 marks. Total 21 marks.

Mid Term II & III (Total 90 Marks, 2.5 HRS. Syllabus From Beginning Of Session)

• Part A: Total number of questions to be given are ten, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For Both Question & Answer**), no objective type or fill in the blanks. Total 20 marks

• Part B: Total number of questions to be given are seven, out of which student has to answer any five. They are long answer type (**Not More Than 50 Words For Question**), each carrying 6 marks. Total 30 marks.

• Part C: Total number of questions to be given are five, out of which student has to answer any four. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 10 marks. Total 40 marks.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** 3 MH4 - 07 Manufacturing Process, 4 AN4 - 06 Aircraft Materials and Processes (Cr 3), 5 AN4 - 05 Aircraft System (Cr 3), 6 AN4 - 05 Avionics-I (Cr 3), 6 MH4 - 03 Applied Hydraulics & Pneumatics (Cr 3), 6 MH5 - 11 Principles of Management (Cr 3), 6 MH5 - 13 Aircraft Electronics System (Cr 3), 7 AN5 - 12 Maintenance of Airframe and System (Cr 3), 7 AN5 - 13 Helicopter Theory (Cr 3), 7 AG6 - 60.1 Human Engineering and Safety (Cr 3), 7 ST - 01 Avionics II (Special Theory Subject) (Cr 3), 7 MH5 - 11 Design of Mechatronics Systems (Cr 3), 7 MH5 - 12 Robotics and Machine Vision System (Cr 3), 7 MH6 - 13 Medical Electronics (Cr 3), 7 AN6 - 60.1 Aircraft Avionic System (Cr 3), 8 AN5 - 12 Maintenance of Power Plant and System (Cr 3), 8 AN5 - 13 Unmanned Aerial Vehicles & Systems (UAV) (Cr 3), 8 MH5 - 13 Product Development & Launching (Cr 3), 8 EC6 - 60.2 Robotics and control (Cr 3)

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER

Question Paper & Student Details

Mid Term	Mid Term 3	Date of Submission	25/09/2020
Name of Faculty	Ms. Varsha	Date of Examination	28/09/2020
Course	B.Tech (Mechatronics Engineering)	Semester	SEMESTER : 7
Batch	Third (3)	Subject	7 MH5 - 12 Robotics and Machine Vision System (Cr 3)

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER


(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Outcome	1) To derive the kinematics for robot manipulators including direct and inverse kinematics. 2) To analyze robot dynamics for control of serial links for robot manipulators. 3) To give an account of the basic theories of machine vision and image processing. 4) To apply robotics and visual sensing technologies to engineering applications.		
Email I'd	varsha@soaneemrana.org	Phone No.	935-106-2262
Student Name		Student Reg No.	

Part A

Question : 1	What are the future applications of robot?		
40	Application of Robotics programming	Industrial Robotics edited by P. Jaganathan, Chapter 7, Page no 7.34-7.46	1
Question : 2	What do you mean by Task oriented Language?		

37	Robot language	Industrial Robotics edited by P. Jaganathan, Chapter 7, Page no 7.12-7.14	4
Question : 3		Define continuous path programming?	
38	Robot and artificial intelligence	Industrial Robotics edited by P. Jaganathan, Chapter 7, Page no 7.32-7.34	4
Question : 4		What is the use of versatile Algorithm Language?	
36	Robot software-Val system	Industrial Robotics edited by P. Jaganathan, Chapter 7, Page no 7.16-7.19	4
Question : 5		What are the two modes of lead through programming?	
35	Computer control	Industrial Robotics edited by P. Jaganathan, Chapter 7, Page no 7.10-7.16	4
Question : 6		What are the different methods of Segmentation?	
31	Segmentation	Industrial Robotics edited by P. Jaganathan, Chapter 5, Page no 5.34-5.36	4
Question : 7		What are the types of Robot kinematics?	
19	Forward kinematics	Industrial Robotics edited by P. Jaganathan, Chapter 7, Page no 7.10-7.16	3
Question : 8		Explain the function of Robot vision system?	
15	MACHINE VISION FUNDAMENTALS	Industrial Robotics edited by P. Jaganathan, Chapter 5, Page no 5.1- 5.64	4
Question : 9		Define Image processing?	
16	Digital images-sampling and quantification-levels	Industrial Robotics edited by P. Jaganathan, Chapter 5, Page no 5.1- 5.64	4
Question : 10		Define Trajectory generation?	
14	Euler formulation- Newton - Euler formulation	Fundamentals of Robotics analysis and control edited by Robert. J.Shilling, Chapter 6, Page no 220-228	2
Part B			
Question : 1		Explain about Rectangular coordinate Robot with diagram?	
3	Work space accuracy	Fundamentals of robotics analysis and control edited by Robert J. Shilling, Chapter 2, Page no. 40-70	2
Question : 2		Explain about the Quality of Robot in term of Repeatability?	
4	Resolution -Repeatability of robot	Fundamentals of robotics analysis and control edited by Robert J. Shilling, Chapter 1, Page no. 11-20	2
Question : 3		Explain about working of DC motor?	
5	Power transmission system	Fundamentals of robotics analysis and control edited by Mr. V.SENTNILRAJA, Chapter 2, Page no. 14-20	3
Question : 4		Explain the working principle of Harmonic Drive?	
7	Harmonics drives	Industrial robotics edited by P. Jaganathan , Chapter 2, Page no. 2.34-2.40	3
Question : 5		What are the classification of End arm tooling according to special purpose process tools incorporated in final gripper design?	
8	Robot End effectors: Introduction- types of End effectors	Industrial Robotics edited by P. Jaganathan, Chapter 3, Page no. 3.1-3.3	2
Question : 6		Discuss the types of mechanical gripper with diagram?	
9	Mechanical gripper- types of gripper mechanism	Industrial Robotics edited by P. Jaganathan, Chapter 3, Page no. 3.3-3.18	2
Question : 7		Explain the force analysis of pivoted type gripper?	
10	Gripper force analysis- other types of gripper- special purpose grippers	Industrial Robot edited by P. Jaganathan , Chapter 3, Page no. 3.18- 3.31	4

Part C			
Question : 1	Derive rotation matrix about an arbitrary axis?		
11	Robot kinematics	Industrial Robot edited by P. Jaganathan , Chapter 6, Page n. 6.1- 6.8	2
Question : 2	Determine the forward and reverse kinematic solution manipulator with three degree of freedom with three joint?		
12	Homogeneous transformation- forward & inverse kinematics- trajectory planning	Industrial Robot edited by P. Jaganathan , Chapter 6, Page n. 6.1- 6.8	3
Question : 3	Derive the composite rotation matrix for the rotation about the Cartesian matrix?		
13	Robot Dynamics	Fundamentals of Robotics analysis and control edited by Robert. J.Shilling, Chapter 6, Page no 194-219	3
Question : 4	Explain Motion analysis of robot by newton approach?		
14	Euler formulation- Newton - Euler formulation	Fundamentals of Robotics analysis and control edited by Robert. J.Shilling, Chapter 6, Page no 220-228	4
Question : 5	Compare various lightning techniques used in machine vision?		
31	Segmentation	Industrial Robotics edited by P. Jaganathan, Chapter 5, Page no 5.34-5.36	3
Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. (Mention question number with relevant fig / numerical / equations. Max 150 KB)			
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			

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