

# 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 / 34 / SET 1

### 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

<b>Mid Term</b>	Mid Term 2	<b>Date of Submission</b>	22/08/2020
<b>Name of Faculty</b>	Ms. Tarun Thukral	<b>Date of Examination</b>	25/08/2020
<b>Course</b>	B.Tech (Mechatronics Engineering)	<b>Semester</b>	SEMESTER : 5
<b>Batch</b>	Fourth (4)	<b>Subject</b>	5 MH4 - 03 Sensors (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)*

<b>Course Outcome</b>	<ol style="list-style-type: none"> <li>1. Able to demonstrate an understanding of the fundamentals of Sensors</li> <li>2. Proficient to understand different types of Sensors, Strain gauge, resolution, accuracy, sensitivity</li> <li>3. Capable to understand applications of Sensors</li> <li>4. Gain an understanding of working and construction of LVDT and Magnetostrictive type sensor</li> <li>5. Competent to understand Capacitive sensors, piezoelectric effect, ultrasonic sensors.</li> <li>6. Students will be able to describe the concept of Thermal sensors, Material used, RTD, Thermister, Thermoemf sensor</li> <li>7. Capable to explain Magnetic sensors, Wiedemann effect, Villari effect, Hall effect, LDR, photodiodes.</li> <li>8. Students will be able to grab a basic understanding of Smart Sensors-film sensor, Radiation Sensors, and their applications make</li> <li>9. Students will be able to differentiate between WSN &amp; Adhoc Networks</li> <li>10. Able to understand Wireless Sensor Networks (WSNs) and apply its various applications.</li> </ol>
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<b>Student Name</b>		<b>Student Reg No.</b>	

<b>Part A</b>			
<b>Question : 1</b>	What do you mean by thermistor?		
19	Thermal sensors	A course in Electrical and Electronics Technology by A.K Sawhney	6

<b>Question : 2</b>	What is the principle of pyroelectric type sensor?		
22	Thermoemf sensor	Handbook of sensor by Jacob Fraden	3
<b>Question : 3</b>	What is villari effect?		
23	Magnetic sensors	Handbook of sensor by Jacob Fraden	6
<b>Question : 4</b>	What is thomson effect?		
24	Magnetic sensors	Handbook of sensor by Jacob Fraden	6
<b>Question : 5</b>	What is hall effect?		
25	Magnetic sensors	A course in Electrical ans Electronics Technology by A.K Sawhney	4
<b>Question : 6</b>	What is the sensitivity and accuracy of a sensor?		
2	Sensing & Transduction	A course in Electrical ans Electronics Technology by A.K Sawhney	2
<b>Question : 7</b>	What do you mean by gauge factor?		
4	Sensing & Transduction	A course in Electrical ans Electronics Technology by A.K Sawhney	2
<b>Question : 8</b>	Explain the types of piezoelectric sensor.		
11	Capacitive sensors	A course in Electrical ans Electronics Technology by A.K Sawhney	5
<b>Question : 9</b>	What is the principle of LVDT?		
7	Sensing & Transduction	A course in Electrical ans Electronics Technology by A.K Sawhney	4
<b>Question : 10</b>	Write the application of thermal sensor.		
17	Thermal sensor	Handbook of sensor by Jacob Fraden	6
<b>Part B</b>			
<b>Question : 1</b>	Explain Hall effect sensor.		
24	Hall effect sensor	A course in Electrical ans Electronics Technology by A.K Sawhney	6
<b>Question : 2</b>	Explain the characteristics of LDR.		
26	Radiation sensor	Handbook of sensor by Jacob Fraden	5
<b>Question : 3</b>	Explain GM counter.		
28	GM counter	Handbook of sensor by Jacob Fraden	6
<b>Question : 4</b>	What is the principle of thermoemf sensor? Write its types.		
20	Thermoemf sensor	Handbook of sensor by Jacob Fraden	6
<b>Question : 5</b>	Explain thermisters in detail.		
19	Thermisters	A course in Electrical ans Electronics Technology by A.K Sawhney	6
<b>Question : 6</b>	Explain the working of Magnetostrictive type inductive sensor.		
6	Inductive sensor	Handbook of sensor by Jacob Fraden	4
<b>Question : 7</b>	Explain the working of LVDT.		
7	LVDT	A course in Electrical ans Electronics Technology by A.K Sawhney	2
<b>Part C</b>			

<b>Question : 1</b>	A thermistor has a resistance temperature coefficient of -5% over a temperature range of 25 to 50 degree celsius. If the resistance of the thermistor is 100 ohm at 25 degree celsius, What is the resistance at 35 degree celsius.		
19	Thermistor	A course in Electrical ans Electronics Technology by A.K Sawhney	6
<b>Question : 2</b>	A thermistor has a resistance of 3980 ohm at the ice point and 794 at 50 degree celsius. Calculate constants a and b of tempertaure resistance relationship.		
19	Thermistor	A course in Electrical ans Electronics Technology by A.K Sawhney	6
<b>Question : 3</b>	The output voltage of a LVDT is 1.5 V at maximum displacement. At a load of 0.5 Mohm, the deviation from linearity is maximum and it is +- 0.003 V from a straight line through origin. find the linearity at the given load.		
7	LVDT	A course in Electrical ans Electronics Technology by A.K Sawhney	2
<b>Question : 4</b>	A capacitive sensor consists of two parallel 0.5 cm square plates separated by a distance of 0.1 mm. find the capacitance in pF. If the plates are displaced in parallel direction, find the sensitivity in pf/mm.		
13	Capacitive sensor	A course in Electrical ans Electronics Technology by A.K Sawhney	5
<b>Question : 5</b>	Derive the formula for voltage & charge coefficient in piezoelectric effect.		
13	Piezoelectric effect	A course in Electrical ans Electronics Technology by A.K Sawhney	5
<b>Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions.</b> (Mention question number with relevant fig / numerical / equations. Max 150 KB)			
<b>I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.</b>			

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