University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

THEORY EXAMINATION – JULY 2021	
B.TECH - Mechanical	**SEMESTER – IV**

TIME – 4 Hrs.

M.M. - 75

PAPER - **MEC-208**

SUBJECT- **Instrumentation and Control**

INSTRUCTIONS TO BE FOLLOWED

1. **The candidates will be required to attempt All questions in Part-A and Part-B (Compulsory Sections). Attempt any four questions from Part-C selecting at least one from each unit.**
2. **Allotted time for examination is 4 hours that includes time for downloading the question paper, writing answers (3 Hrs.), scanning of answer sheets and uploading the sheets on the Attendance Sheet Cum Answer Sheet Uploading google form.**
3. **The PDF files should be saved as Roll No. and Subject Code.**
4. **Maximum Page Limit should be 36 (Thirty Six) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the UIET Website.**
5. **Over-attemptation should be avoided.**
6. **Handwriting should be neat and clean and diagrams should be clear and contrasted.**
7. **The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.**
8. **While attempting the paper, the candidate will use blue/black pen only.**
9. **Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.**
10. **Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.**
11. **Attempt parts A, B & C separately. Do not inter-mix them. Write neatly & mention the question number clearly.**
12. **Use Steam Tables and Mollier Chart, wherever necessary.**

PART-A (15 Marks)

Q. No. – 1 Answer the following questions. 15x1=15

(i)	Define the term "Calibration" and "Standard of Measurements.
(ii)	Explain the function of Primary Standard.
(iii)	Give examples of self-generating type of transducer.
(iv)	Define the term "Error".
(v)	Define Sensor and classify its type.
(vi)	Match the following (i) Analog transducer (a) Vibrating String (ii) Digital Transducer (b) Photo-Conductive
(vii)	Name the instrument used for angular measurement.
(viii)	Name the most sensitive type of sensing element for strain measurement.
(ix)	Discuss on which law the working principle of constant volume thermometer is based.
(x)	Name the non-electrical methods of temperature measurements.
(xi)	What is the freezing and boiling temperature of water on Fahrenheit scale?
(xii)	Define dry blub temperature and wet blub temperature.
(xiii)	Difference between sensor and smart sensors.
(xiv)	Define term virtual instrumentation,
(xv)	Give examples of feedback control system.

PART-B (20 Marks)

	UNIT-I	
2	**Explain the functional element of a measuring system with neat sketch.**	**5**
	UNIT-II	
3	**Distinguish between sensors and transducer.**	**5**
	UNIT-III	
4	**A McLeod gauge has volume of bulb, capillary and tube down its opening equal to 90 cm^3 and a capillary diameter of 1 mm. Calculate the pressure indicated by a reading of 3cm on the Capillary tube.**	**5**
	UNIT-IV	
5	**Define transfer function with block diagram.**	**5**

PART-C (40 Marks)

	UNIT-I	
6	**Explain the typical application of instrument systems with block diagram.**	**10**
7	**Illustrate the static performance parameters of instruments.**	**10**

	UNIT-II	
8	**Distinguish between the following** **(i) Capacitive type transducer** **(ii) Piezo-electric type transducer**	**5** **5**
9	**(i)Define load cell and explain its type.** **(ii) In a gear box type transmission type dynamometer, the input and output shafts are co-axial and rotate in the same direction at a speed of 1600 and 400 rpm, respectively. An external torque is applied to the casting to prevent it from rotating using a mass of 120 kg at a distance of 30cm from the axis. The overall mechanical efficiency is 90%. Find the power at the input shaft.**	**10**
	UNIT-III	
10	**Explain the moderate pressure measurement techniques.**	**10**
11	**Explain the following** **(i) Hair Hygrometer** **(ii) Humistor Hygrometer** **(iii) Measurement of pH value.**	**10**
	UNIT-IV	
12	**(i) Define control system. Classify the components of control system.** **(ii) Explain open loop and closed loop control system**	**10**
13	**Explain** **(i) Pneumatic controller (ii) Hydraulic controller**	**10**