GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

R4A19001124

Registration No: | | | | | | | | | | |

Total Number of Pages : 2 B.TECH

4th Semester Regular Examination-April-May 2019

BMEPC4040 MECHANICAL MEASUREMENT & METROLOGY

(Regulations 2017) MECH ENGG.

Time : 3 Hours Maximum : 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) 10 x 2=20 Mark

Q.1. Answer *All* Questions.

a	Surface roughness of a sample is measured by following instrument? a) Profilometer b)Vernier caliper c) Micrometer d) Autocollimator	CO4 PO1
b	Pitot tube is used a)to measure fluid temperature b)to measure fluid flow velocity c) to measure rotational speed of shaft or disc d)to measure the temperature of a surface	CO3 PO1
c	Which of the following instrument is used for the measurement of temperature? a) Thermocouple b) Pyrometer c)Thermometer d) All of the above	CO3 PO1
d	Venturi effect is found a) during fluid flow b) during heat transfer c) both a and b d) none of the above	CO3 PO1
e	Repeatability of the instrument with respect to a given fixed input is: a) accuracy b) precision c)resolution d)sensitivity	CO1 PO1
f	Amplitude ratio of first order instrument : **a)** can be zero b) is greater than zero c)lies between zero and one c)is greater than one	CO1 PO1
g	LVDT works on principle. a) variable resistance b)variable self-induction c)variable mutual induction d)variable capacitance	CO2 PO1
h	A solar cell is: a) photo-voltaic transducer b) photo-emissive transducer c)photo-conductive transducer d) photo-resistive transducer	CO2 PO1
i	The foundation for all dimensional measurements is the a) datum plane b) datum line c) datum point d) geometry of work piece	CO1 PO1
j	Amplifier is used for a) to increase the velocity of fluid flow c) to reduce the power of a signal b) to increase the power of a signal d)both b and c	CO2 PO1

PART – B: (Short Answer Questions)10x2 = 20 Marks

Q.2. Answer *ALL* questions

a	What is resolution ?	CO1 PO1
b	Explain the principle of pitot tube.	CO3 PO2
c	What is the significance of calibration of slip gauges?	CO4 PO1
d	Explain the following methods of quantifying surface roughness: (a) Rz value, (b) RMS value, and (c) Ra value.	CO4 PO2
e	Explain about the photo-electric transducer.	CO2 PO1
f	Describe straightness, flatness and roundness.	CO4 PO2
g	Explain about tachometer and tacho-generator.	CO3 PO2
h	Explain the principle of optical pyrometer.	CO3 PO2
i	Describe about Cathode Ray Oscilloscope.	CO2 PO2
j	Discuss on gauge factor in strain gauges.	CO3 PO1

PART – C: (Long Answer Questions) 4x 15= 60 Marks

Answer *ALL* questions

Q.3			
a	Explain about accuracy and precision in details.	8	CO1 PO2
b	Describe different types of errors in measurements with neat sketch.	7	CO1 PO2
	OR		
c	Explain about impedance loading and matching.	8	CO1 PO1
d	Explain in detail about system compensation.	7	CO1 PO2
Q.4			
a	Enumerate the advantages of electrical transducer elements.	8	CO2 PO2
b	Explain about potentiometer devices.	7	CO2 PO2
	OR		
c	Explain the principle of following transducer with neat sketches a) Sliding –Contact device b) Capacitive type torque – meter.	8	CO2 PO2
d	Explain the working of a piezoelectric transducer for pressure measurement.	7	CO2 PO2
Q.5			
a	Describe about electrical strain gauges.	8	CO3 PO2
b	Derive an expression for the gauge factor.	7	CO3 PO1
	OR		
c	What is pyrometry? Explain in detail the theory of pyrometry.	8	CO3 PO2
d	With a neat sketch, explain the working of venturi meter.	7	CO3 PO1
Q.6			
a	State and explain Taylor's principle of gauge design.	8	CO4 PO1
b	Explain why hole basis system is generally preferred.	7	CO4 PO2
	OR		
c	Discuss different methods of measurement of gear tooth thickness and comment on their accuracy.	8	CO4 PO1
d	A shaft is manufactured within the specified limits of 30.02 and 29.98 mm. Find the high and low limits of the bush to give a maximum clearance of 0.10 mm and minimum clearance of 0.02 mm.	7	CO4 PO2

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