University of Mumbai Examination First Half 2022

Program: BE Mechanical Engineering Curriculum Scheme: Rev-2019 Examination: TE Semester V

Course Code: MEC501 and Course Name: Mechanical Measurement and Control

0.1

Option C:

Option D:

Q5.

Option A:
Option B:

Option C:

Option D:

Time:3 hour Max.Marks:80

Choose the correct option for following questions. All the Questions are

compulsory and carry equal marks Drift is defined as Q1. Option A: Variation in input of the instrument with respect to desired input Option B: smallest change in input quantity which can be measured with an instrument Option C: Variation in output of the instrument from the desired value for given input Option D: degree of closeness with which a reading is repeated again and again A voltmeter has a uniform scale with 100 divisions. The full-scale reading is 10 V Q2. and could be read upto 1/10 of a scale division with some degree of certainty. It's resolution is 0.1 V Option A: Option B: 0.02 V Option C: 0.001 V Option D: 0.01 V Q3. McLeod gauge Option A: can be used for pressure below 0.1×10⁻³ torr Option B: gives continuous output is sensitive to condensed vapours that may be present in the sample of the gas Option C: whose pressure is being measured Option D: can not be used as standard for vacuum measurement Q4. NO GO gauges are designed Option A: for maximum shaft limit and minimum hole limit for maximum hole limit and minimum shaft limit Option B:

for maximum hole and shaft limit

for minimum hole and shaft limit

sign, is the RMS value

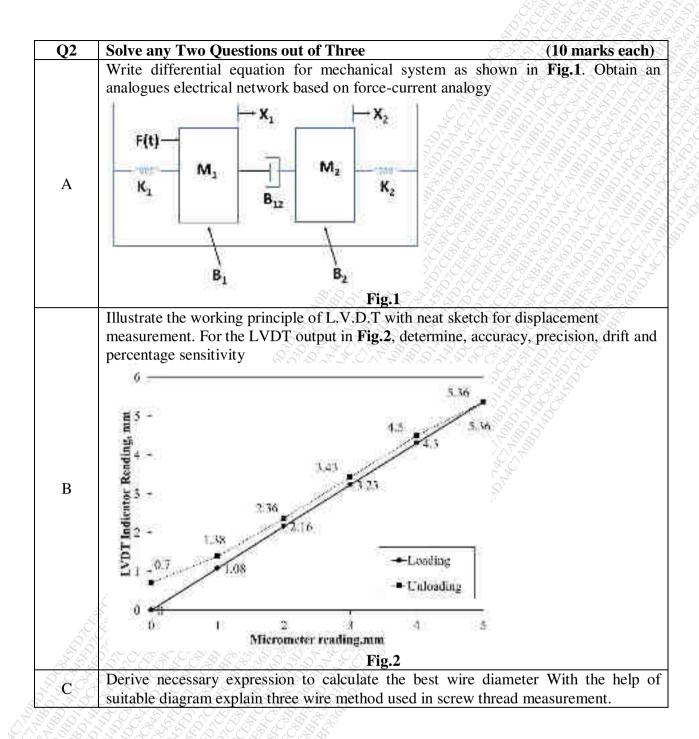
Rz value

Ra value

Rm value

The average height from a mean line of all ordinates of the surface, regardless of

Q6.	Steady state error is	200
	0 0 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
	a) $e_{ss} = \lim_{s \to 0} \frac{s R(s)}{1 \pm G(s) H(s)}$	3
	b) $e_{ss} = \frac{s R(s)}{1 \pm G(s)H(s)}$	
	$C) e_{SS} = \lim_{s \to 0} \frac{s}{1 \pm G(s)H(s)}$	7 D 20
	d) $e_{SS} = \lim_{s \to 0} \frac{s R(s)}{G(s)H(s)}$	A SON
Option A:		
Option B:		
Option C:		
Option D:	D	
0.7		
Q7.	The transient response of control system is	
Option A:	Response is a function of input	
Option B:	response is a function of time	
Option C:	response remains constant with time	
Option D:	Response is zero	
Q8.	The analogous electrical component for angular displacement in mechanic system in F-I analogy	al
Option A:	Charge	
Option B:	Flux	
Option C:	Resistance	
Option D:	capacitance	
DOG 8, 25 E		
Q9.	The order of a system is represented by The Routh-Hurwitz criterion cannot be applied when the characteristic equation of the system contains any coefficien which is:	
Option A:	Negative real and exponential function	
Option B:	Negative real, both exponential and sinusoidal function of s	
Option C:	Both exponential and sinusoidal function of s	
Option D:	Complex, both exponential and sinusoidal function of s	
Q10.	Surface texture depends to a large extent on	
Option A:	material composition	
Option B:	type of manufacturing operation	
Option C:	skill of the operator	
Option D:	accuracy of measurement	
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Q3	Solve any Four out of Six (5 marks each)
À	Explain Principle, construction and working of Parkinson's Gear Tester
B	Explain Laser Interferometer with neat sketch.
C	What do you mean by waviness and roughness
Đ	With respect to surface roughness parameters explain the following terms i) Ra ii) Rz iii) RMS
Ê	Define gauge factor for strain gauge and write expression of it
F	Explain routh criterion for stability with example
A A) (Z (

Q4.	Solve any Two Questions out of Three 10 marks each
A	For a particular unity feedback system $G(s) = \frac{64(S+2)}{S(S+0.5)(S^2+3.2S+64)}$ Sketch the Bode Plot, Find ω_{qc} , ω_{pc} , GM and PM. Comment on stability.
В	A unity feedback system characterised by an open loop transfer function $G(S) = \frac{K}{S(S+10)}$ Determine the gain K. so that the system will have a damping ratio of 0.5. for this value of K determine settling time, peak overshoot, and time to peak overshoot for unit –step input.
С	What is encoder? With a neat sketch explain working of an incremental and absolute optical encoder. Explain in detail with example