Total No. of Pages : 02

Total No. of Questions : 18

B.Tech (Civil Engg.) (2018 & Onwards) (Sem.–1,2) MECHANICS OF SOLIDS Subject Code : BTPH-101-18 M.Code : 75351

Time: 3 Hrs.

Max. Marks:60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION B & C. have FOUR questions each.
- 3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
- 4. Select atleast TWO questions from SECTION B & C.

SECTION-A

Write briefly :

- 1. What are the properties of equipotential surfaces?
- 2. Differentiate between rotational and irrotational force field.
- 3. Define Centripetal and Coriolis accelerations.
- 4. Discuss the energy decay in a damped harmonic oscillator.
- 5. Write the differential equations of motion for a particle executing simple, damped and forced oscillations.
- 6. State the parallel-axis and perpendicular axis theorems of moment of inertia.
- 7. Define a Rigid Body.
- 8. Justify the statement, "friction is a necessary evil".
- 9. Give some methods to increase and decrease friction.
- 10. State the generalized Hooke's law. How it is different to special form of Hooke's law?

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SECTION-B

11. a) Define the potential energy function (F) and show that F = Grad V.

	b)	Make a summary of different forces in nature.	4	
12.	Us and	ing Newton's laws of motion, deduce the conservation theorems of angular momenta d energy for the motion of a system of particles.	um ,4	
13.	Di qu	scuss the methods (logarithmic decrement, relaxation time and quality factor) antitative measurement of damping effect in a damped simple harmonic oscillator. 3,3	for ,2	
14.	Wl han oso	hat are forced oscillations? Establish a differential equation of motion for a forc rmonic oscillator and obtain an expression of displacement. Discuss the cases of forc cillations. 1,5	ed ed 2	
SECTION-C				
15.	a)	Derive the expression for angular momentum about a point of a rigid body in plan motion.	nar 4	
	b)	Define : Centre of mass and momentum of inertia.	4	
16.	a)	State perpendicular axis theorem of inertia and prove it.	5	

- b) Derive the expression for the moment of inertia of a circular ring about its centre. 3
- 17. a) Discuss different types of friction. Why rolling friction is less than kinetic friction? 4

	b)	State all laws of static and limiting friction.	4
18.	a)	Define stress and strain and their different types.	5
	b)	Explain Generalized Hooke's law.	3

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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