A		Reg. No. :											
Question Paper Code: 52106A													
B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019													
Second Semester													
		Civil Eng	gine	ering	5								
	15	UCE206-BASIC ENGI	NEI	ERIN	NG N	AEC:	HAN	IICS					
		(Regulat	tion	2015	5)								
Dui	cation: Three hours					N	/laxi1	num	n: 100	) Ma	rks		
		Answer AL	LQ	uesti	ions								
		PART A - (10 x	x 1 =	= 10	Mar	ks)							
1.	If two forces of 3kg and 4kg act at right angles to each other, their resultant force will be equal to							CO	)1-H				
	(a) 7kg	(b) 1kg		(c) 5	kg				(d)	1/7k	g		
2.	What is not the comof axis?	dition for the equilibriu	um	in th	ree	dime	nsio	nal s	ystei	m		CO	)1-F
	(a) ∑Fx=0	(b) ∑Fy=0		(c)	∑Fz	=0				(	d) ∑	F≠0	
3.	The unit of force in	S.I. system of units is										CO2-R	
	(a) dyne	(b) kilogram		(c) n	ewto	on			(d)	watt			
4.	Reactions at the supports of a structure can be determined by equating the CO2-I algebraic sum of												
	(a) Horizontal forces to zero												
	(b) vertical forces to zero												
	(c) moments about any point to zero												
	(d) all the above												
5.	The co efficient of friction depends on							CO	)3-F				
	(a) Area of Contact (b) Shape of surface												
	(c) Strength of surfa	ices		(d)	Nati	ure o	f sur	face	S				

6.	The angle of inclination of the plane at which the body begins to move down the plane, is called							
	(a) angle of friction (b) angle of	repose (c) angle of p	rojection (d) none o	f these				
7.	The center of gravity of a semi-circle lies at a distance of from its pase measured along the vertical radius.							
	(a) $4r / 3\pi$ (b) $3r / 8$	(c) $3r / 4\pi$	(d) 4r / 6π					
8.	The Centre of gravity of a 10 cm x 15 cm x 5 cm T section from its CO4-R bottom, is							
	(a) 7.5 cm	7.5 cm (b) 5.0 cm						
	(c) 8.75 cm	(d) 7.85 cm						
9.	The distance in the parallel axis theorem for the use in the determination of CO5-R the product of the moment of inertia is multiplied by:							
	(a) Area (b) Volume	(c) Linear distance	(d) Area/Vol	ume				
10.	What is the formula of theorem of pe	erpendicular axis		CO5-R				
	(a) $I_{ZZ} = I_{XX} - I_{YY}$ (b) $I_{ZZ} = I_{XX} + A$	$h^2$ (c) $I_{ZZ} - I_{XX} = I_{YY}$	(d) None of the abov	e				
PART - B (5 x 2= 10Marks)								
11.	State Varigon's theorem							
12.	State the different types of supports.							
13.	Classify the types of friction							
14.	What is mean by axis of symmetry?							
15.	State parallel axis theorem			CO5-R				
PART – C (5 x 16= 80Marks)								

16. (a) The four coplanar forces are acting at a point as shown below. CO1-App (16) Determine the resultant in magnitude and direction?



- (b) A force vector of magnitude 100 N, is represented by a line AB of CO1-App (16) co-ordinate a(1,2,3) and B(5,8,12) determine (16)
  - (i) The components of the force along x,y and z axes
  - (ii) Angles with x,y and z axes
  - (iii)Specify the force vector
- 17. (a) Determine the support reaction of the beam as shown in fig. CO2-App (16)



Or

(b) A truss of 8 m span is loaded as shown in below figure. Find the CO2-Ana (16) support reactions.



18. (a) A uniform ladder of weight 1000N and length 4m rests on a CO3-Ana (16) horizontal ground and leans against a smooth vertical wall. The ladder makes an angle of 60° with horizontal. When a man of weight 750N stands on the ladder, the ladder is at the point of sliding. Determine the co efficient of friction between the ladder

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and the floor.

Or

(b) (i) A belt is running over a pulley of diameter 800mm and CO3-Ana (8) develop a tension of 900 N on the tight side and the angle of lap is 165<sup>0</sup> and coefficient of friction b/w the belt and pulley is 0.15. Find the power transmitted by the pulley when it rotates @ 300RPM.

(ii) State coulombs' laws of dry friction. CO3-U (8)

19. (a) Locate the centroid of the given section as shown in fig.7

CO4-Ana (16)





(b) Locate the centroid of the L-section shown in below figure. CO4-Ana (16)



20. (a) Find the moment of inertia of the section about its centroidal axis CO5-U (16) as shown in fig.



- (b) (i) State moment of inertia theorems
  - (ii) Derive the expression for moment of inertia about major axis CO5-U (8)

CO5-U (8)

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of a rectangular lamina of breadth b and depth d.

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