END SEMESTER/RETEST EXAMINATION, 2020

Semester:3rd

Subject code: BES-304

Subject: Applied Mechanics

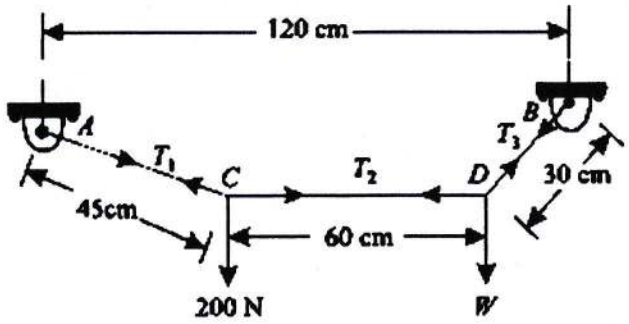
Full Mark: 70 (part A-25 + Part B-45)

Duration: 3 hours

Instructions:

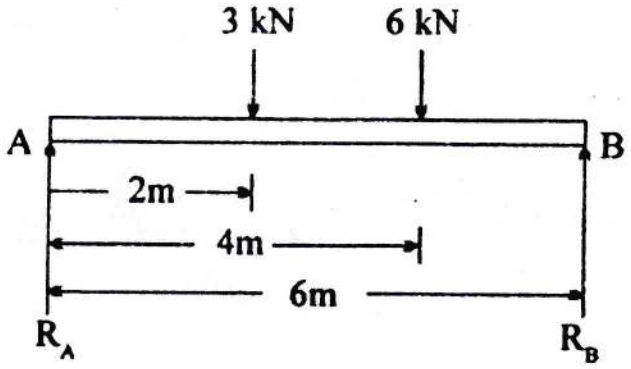
1. Questions on Part A are compulsory
2. Answer any five questions from Part B

PART-A MARK-25		
Question no.	Questions	marks
Question 1	Fill in the blanks:	1x10-10
1a	The process of finding out the resultant force of a number of given forces, is called _____	
1b	If the arm of a couple is doubled, its moment will be _____	
1c	The unit of work in SI system is _____	
1d	If sum of all the forces acting on the body is zero, then the body may be in equilibrium, provided the forces are ___	
1e	Angle of repose is equal to ____	
1f	The maximum value of static friction is _____	
1g	A frame structure is perfect if it contains member equal to _____	
1h	The centroid of triangle is the point of _____ of its medians	
1i	Friction produces _____	
1j	The parallel axis theorem uses the _____ of the distance.	
Question no.2	Write true or false:	1x5=5
2a	The SI unit of pressure is Joule.	
2b	A body is said to be in equilibrium if it has no motion	
2c	A redundant frame is also imperfect frame	
2d	The SI unit of moment is dyne-cm	
2e	The forces, which meet at one point are known as concurrent forces.	
Question no. 3	Choose the correct answer	1x10=10
Q 3(i)	The unit for force in SI system of units is	

	kNforce with x-axis are 60^0, 120^0 and 240^0respectively. Determine the magnitude and direction of the resultant force	
Question no.5		
Q5a	A rope is connected between two points A and B 120 cm apart at the same level. A load of 200 N is suspended from a point C on the rope 45 cm from A as shown in Fig1. Find the load that should be suspended from the rope D 30 cm from B, which willkeep the rope CD horizontal.  Fig 1	6
Q5b	State and prove Lami's theorem.	3
Question no. 6		
Q6a	What is a frame? State the difference between a perfect frame and an imperfect frame.	4
Q6b	Define friction. State the laws of static and dynamic friction	5
Question no. 7		
Q7a	Define the following terms: i) Variable acceleration (ii) Uniform retardation	4
Q7b	The straight line motion of an object is given by $s=12t + 3t^2-2t^3$ Where S = displacement in meters and t= timein seconds. Calculate the displacement, velocityand acceleration after 2 seconds.	5
Question no. 8	Write the differences between centre of gravity and centroid. Find the moment of inertia about the horizontal centroidal axis of an "I" section of the following dimension: Top flange=10 cm X 2 cm Web= 2 cm X 15 cm Bottom flange = 20 cm X 2 cm.	2+7=9
Question no. 9		

a) Dyne c) Newton	b) kilogram d) watt	
3(ii)	One kgf is equal to	
a) 7.8 N c)9.8 N	b) 8.9 N d) 12 N	
3(iii)	The rate of change of velocity is called	
a) Displacement c)angular velocity	b) acceleration d)angular displacement	
3(iv)	Which of the following quantities is not a vector?	
a) Mass c)Impulse	b) Momentum d) Acceleration	
3(v)	The coefficient of friction depends upon	
a) Nature of the surface c)Shape of the surface	b) Area of contact d) All of the above	
3(vi)	A force is completely defined when we specify	
a) Magnitude b) Direction c) Point of application d) all of the above		
3(vii)	Which of the following is not the unit of distance?	
a) Angstrom b) Light year c) Micron d) Millimeter		
3(viii)	Which of the following is not a scalarquantity?	
a) time b) mass c) volume d) acceleration		
3(ix)	The units of moment of inertia of massare	
a) kgm^2 b) m^4 c) kg/m^2 d) kg/m		
3(x)	Tangent of angle of friction is equal to	
(a) Kinetic friction (b) Limiting friction (c) Angle of repose (d) Coefficient of friction		

PART-B, MARK-45		
Questions no.	Questions	marks
Question no. 4		
Q4a	Differentiate between resolution of force and composition of force?	2
Q4b	What do you mean by engineering mechanics? Classify it.	2
Q4c	Three forces of magnitude 30 kN, 10 kN and 15 kN are acting at a point O. The angles made by 30 kN force, 10 kN force and 15	5

Q9a	A simply supported beam AB of span 6m carries centre point loads of 3kN and 6kN at a distance of 2 m and 4m from the left end A as shown in figure. Find the reactions at A and B.  Fig 2	7
Q9b	What is a couple? Enumerate its various characteristics.	2

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