G.R. No. | | U118-1014 (BEFS)

December 2018/Backlog Examination

F. Y. B. TECH. (COMMON) (SEMESTER - II)

COURSE NAME: Engineering Mechanics

COURSE CODE: CV12176

(2017 PATTERN)

Time: [2 Hours]   [Max. Marks: 50]

(*) Instructions to candidates:
1)   Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5
2)   Figures to the right indicate full marks.
3)   Use of scientific calculator is allowed.
4)   Use suitable data where ever required and state them clearly.

Q.1) a) A pin jointed truss is loaded and supported as shown .Find the forces in   members by using method of joints   [6 marks]
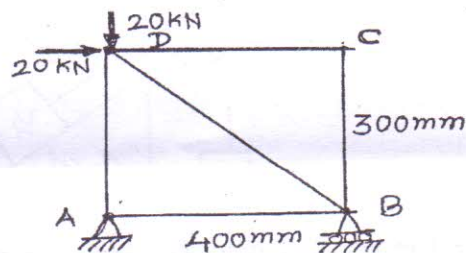
b) Determine the reactions at hinged supports A and D for pin jointed frame loaded as shown   .All pin connections are frictionless . Pin at B   [6 marks]
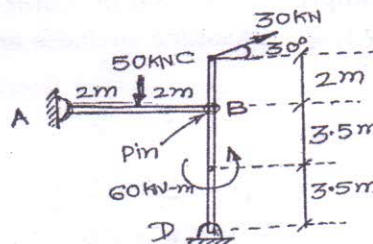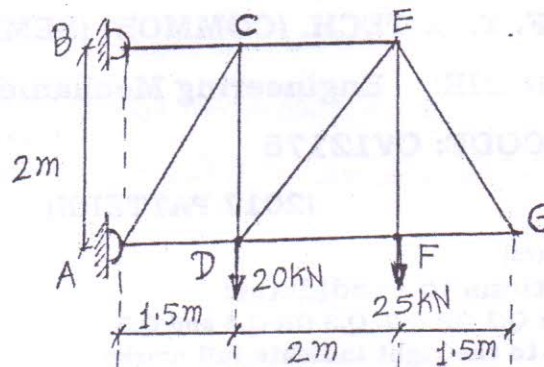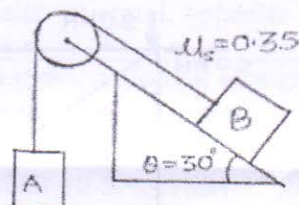
c) State the laws of friction [4 marks]

OR

Q.2) a) Find forces in the members CE, DE and DF by method of sections for the given truss as shown [6 marks]

b) Knowing that $W_A = 100N$ and $\theta = 30°$, Determine the smallest and larg[e] Value of W_B for which the system is in equilibrium. Coefficient of static friction is 0.35 [6 marks]

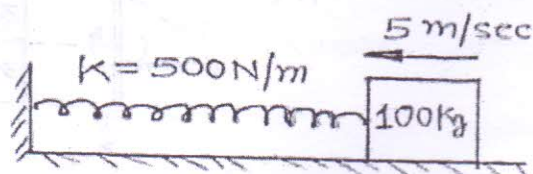

c) State the relation between tight side and slack side in case of flat belt friction. Write the meaning of each tem used in relation [4 marks]

Q.3) a) A body of mass 100kg moves with a velocity of 5m/s as shown and gets in contact with a compression spring of stiffness 500N/m. What is the deflection [of] spring when body stops? Assume surfaces are smooth [6 marks]

b)A body of mass 10kg falls from a height of 100m ,1) what is the potential energy at 100m from ground ? 2) what is the velocity at 50m from top ? 3)what is the velocity at ground? use work energy principle   [4marks]
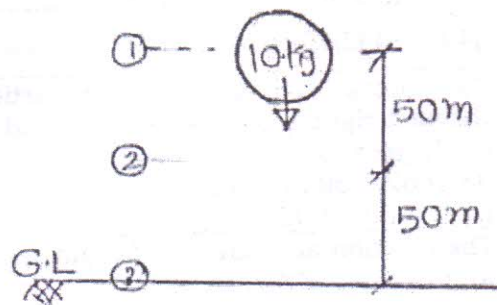
c)State the Impulse –Momentum Principle and write the meaning of each term used in it   [4 marks]
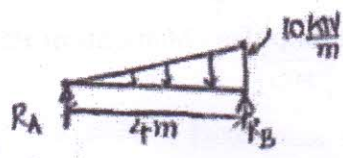
OR

Q4) a)A 25000kg rail road car moving at a speed of 0.75m/s to the left collides with the 30000kg rail road car which is at rest .After collision ,30000kg car is observed to move to left at a speed of 0.36m/s .Determine the coefficient of restitution between the two cars .   [6 marks]

b)A motor cycle of mass 120kg is travelling on a horizontal road at 54kmph .Find the time required to stop the motorcycle if the coefficient of friction between wheel and road surface is 0.4 .Use Impulse momentum principle   [4 marks]

c) State the impulse momentum principle and write the meaning of each term used in it   [4 marks]

Q.5) Attempt following multiple choice questions: [20 marks]

a)	The process of splitting the force into components having same effect is called as --------- i)Composition of forces ii) Vector addition of force iii)Resolution of force iv)Decomposition of force	[1]
b)	When the resultant of force system acting on body is zero, the body is said to be in ------------ i)rotating condition ii) translation condition iii)dynamic condition iv) equilibrium condition	[1]
c)	The study of kinematics of particle does not deal with -------- i)displacement ii) velocity iii) acceleration iv) force	[1]

d)	In curvilinear motion ,velocity of particle is always ------------ to the curved path at every instant i)tangential ii) normal iii)horizontal iv) vertical	[1]
e)	If two forces of magnitude 20KN and 20KN act on body ,then their maximum resultant is ....KN i)40 ii)30 iii)10 iv)20	[2]
f)	Two forces 3N and 1N act on particle .The resultant when they act right angles is -------- N and resultant when they act 60 degrees is -------------------N i)3.1662,3.605 ii)4.1662,4.605 iii)2.1662,2.605 iv) 1.1662,1.605	[2]
g)	The reaction at A and B of beam as shown are --------KN at A and -----------KN at B i)7.6,3.13 ii) 6.7,13.3 iii) 13.3,6.7iv) 3.13,7.6	[2]
h)	Two couples acting in plane may be in equilibrium only when their moments are -------------in magnitude and -----------in direction i)unequal ,opposite ii) equal, opposite iii)equal ,same iv) unequal, same	[2]
i)	A particle starts moving along a straight line with initial velocity Of 25m/s under uniform retardation of 2.5 m/s² ,then velocity and displacement at t=5sec is --------------m/s and -----------m i)25,50 ii) 50,100iii) 12.5,93.75iv) 93.75,12.5	[2]
j)	In Newton's second law of motion ,force is equal to ------x------- i)distance, velocity ii)velocity ,displacement iii)mass, distance iv) mass ,acceleration	[2]
k)	A projectile is fired with initial velocity of 10m/s at an angle of 30 degrees with horizontal ,its range is -------m i)9.827 ii) 10.827iii) 8.827iv) 7.827	[2]
l)	A projectile is fired with initial velocity of 20m/s at an angle of 40 degrees with horizontal, its time of flight is -------sec i)2.623 ii) 3.623 iii) 6.23iv) 62.3	[2]

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