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Malla Reddy Institute of Engineering & Technology (Sponsored by Malla Reddy Educational Society) Approved by AICTE, New Delhi,Permanently Affiliated to JNTU,H,Accredited by NBA,NAAC ISO 9001-2015 Certified institution, Oracle Workforce Development Programme Maisammaguda, Dhulapally (Post via Kompally), SecĀĀĀĀBad - 500 100. Phone: 040-65552040, Cell: 9676402671, 9676402608 Department of Humanities & Sciences SUBJECT: ENGINEERING MECHANICS UNIT ĀĀĀĀ I SHORT ANSWER QUESTIONS: 1. Define Force 2. Define resultant of a force. 3. State polygon law of forces. 4. State triangle law of forces. 5. State and prove parallelogram law of forces 6. Define system of forces. 7. Two equal forces of magnitude P acting at right angle to one another what is the resultant. 8. Define couple 9. Define free body diagram 10. Define Equilibrium and equilibrant 11. State lamieĀĀĀs theorem. 12. What are Classification of forces 13. Declare Varignon 14's theorem. Which is the result of force 15. Set the time and marry an example 16. What are the equations of balance of long answers questions 1. A 3000 ball N shown in the figure below is supported by A P traction and a weight of 2000 n passing by a frictionless pulley. If $\mu = 300$, calculate the values of p and $1 \pm$. If the force resulting from the forces 200 n, 260 n and $1 \pm$ is directed to the positive x-axis and 800 n in magnitude, determine the magnitude of the force 1 and its orientation 1 , y 3. Two identical rollers, each of 100 N, are supported by an inclined plane and a vertical wall, as shown in the figure below. Assuming smooth surfaces, find the reactions induced in support points A, B and C. 4. A weight ball $Q = 12$ N rests on a right-angle straw, as shown in the figure below. Determine the forces exerted on the sides of the trough in d and if all surfaces are perfectly smooth. Five. Three cylinders are placed in a rectangular box, as shown in the FIG. below. Neglecting friction, determine the reaction between the cylinder A and the vertical wall. 6. A system of four forces acting in a body is as shown in the figure. Determine the resultant and the direction of force. 7. An eye bolt is caught pulled from the ground by three forces, as shown in the figure, determine the balances in the screw of the eyes that resist leaving. Eight. The result of four forces that are acting at a point O, as shown in the figure, is along the y-axis. The magnitude of the F_1, F_3, F_4 , is 10kn, 20kn and 40kn, respectively. The angles manufactured by 10kn, 20kn and 40kn with x-axis are 30o, 90o and 120suspectively. Find the direction and magnitude of the F_2 force if the resulting one is 72kn? 9. The system of forces acting in a bell crank is shown in Fig. Determines the magnitude and direction and application point of the resultant. 10.Cargo system acting in a beam, as shown in Fig. Determine result of the loads. 11. Find the result of the Forion System given as shown in the fig tree. 12. The parallel system of five forms 12kn, 15kn, 24kn, 30kn and 20kn is shown in the fig tree. Reduce the system to a force and a pair at the point. 13. Determine the result of the four forms shown in the fig tree. Each form makes a 150- time with the vertical except for the 2000N forms that is vertical. UNIT-II Short Questions: 1. 2. 4. 5. What does the frictional force mean? Explain the difference between friction coefficient and friction? Declare the laws of friction and dynamic? What do you want to say with the rest of rest? A 60N weight body is placed on a horizontal plane. To just move the body in the horizontal plane, an 18N push is required to be inclined at 20° to the horizontal plane. Do you find the coefficient of friction? 6. What is the differential screw tack? 7. What is frican cone? 8. Weight body 1500N is placed in a horizontal plane. If the coefficient of friction between the body and the horizontal plane is 0.4, determine the necessary horizontal force to slide only the body of the avinon? 9. What are the laws of friction 10. What does it mean stretches? DĀĀ An Example 11. What does dynamic friction mean? DĀĀ an example 12, which is wedge of wedge 13, which is jack friction screw 14, define the resistance to bearing, 15. Defines Centroid. 16. Define the center of gravity 17. Differentiated Centroid and Center of Gravity. 18. Define the Theorem of Cappel I. 19. Define the theorem of CBPPU II. 20. Define the Centroid of the 21st. Define the center of gravity of the area. Long Answer Questions: 1. A body of weight 500 n \odot pulled an incline plane, by a 350 n force. Force is applied parallel to the avion. Determine co-efficient friction. 2. A body of weight 450 n is pulled up along an inclined plane with leaning 30° * * horizontal in a one of rartnocnE .01 }arugiF an odartson omoc{ adaeRbm os aer;Ā ad edirtocne o ezilacOL .9 .esab aus erbos lena raluric odilĀĀs enoc mu ed lartnc edadivarg a ranimretd arap oipĀCnrip ortemirp od oĀAsserpxe amu ravireD .8 ?latnoziroh arap amic arap o 03 a auta P }bl (latnoziroh \odot Ā P }a (es .B ocobL o revom arap P ed rolav o res eved laud .3/i \odot Ā osip o e B ertne $5.2, \odot$ Ā b ocobL o e A ocobL o ertne otirta ed etneicifeoc o eS .latnoziroh aiedac moc ederap Ā odarrama \odot Ā A ocobL arugif an odartson omoc N0002 sosep euq B ocobL erbos ues rasnaced N0001 osep mu raeuqoLB .7 .3/i \odot Ā seicĀfrepus sa sadot arap ¼ otirta ed etneicifeoc O ?oĒĀiva o oxiab arap sdnepmi N 90 ocobL od otnemivom o euq arap arugif an .} olugnĀĀ od rolav o res eved laud Q .6 .otirta mes res arap otirta e 2.0 oĀes socobL so bos otirta ed etneicifeoc O o euq amussaĀ .atierid a arap sĀAednepmi oĀĀĀom a euq moc rezat arap P sĀĀrof ad rolav romem o ranimretdE .5 .ametsis od oirĀĀliuge o arap W ed rolav roiam o e romem o rartnocne .02,0 \odot Ā CA oĒĀiva o e ocobL o ertne euq e 82,0 \odot Ā CB oĒĀiva o e ocobL o ertne otirta ed etneicifeoc o eS .CA oĒĀiva on odnasnaced e snotweN W odnasep ocobL mu arap allop amu rop odnassap asor amu rop odarrama \odot Ā e CB odanilicni onalp on asnaced N0001 osep ed ocobL mU .arugif an odartson omoc C me latnoziroh ortnocne o arap o03 e 006 a sodanilicni CB e CA seĀĀiva si0D .4 ?ragerotce adace a ocobL {Āres otla oĒĀuq .redneca adace ad euq od edatnem ed \odot Ā osep ojuc .memoh mu 65 .5.0 \odot Ā oĒĀhc o adace a ertne euq e 4.0ĒĀĀ edarap a e adace a ertne otirta ed etneicifeoc O .054 ed olugnĀĀ mu zaf laiq a moc lacitrey ederap amu artnoc asuoper ortnemirpmoc ed m 4 ed emrofnu adace amU .3 .oproc on otief ohlabart o ertnocnE .oĒĀiva od ognoL na m 01 ed rol oproc olep adirtocrep aicnĀĀtsid a eS .enilicni onalp o a lealarap adacilpa rol oĀĀĀrof a e 52.0 rol ot oĒĀiva o e oproc o ertne otirta ed etneicifeoc o e es airĀĀssecon sĀĀrof a ertnocnE .edadicolev of the simple blade shown in Figure 11. From initial principles deduce an expression to determine the center of a base triangle 'b' and height 'h'. 12. Find the centroid of the shaded blade shown. 13. Find the centroid of the shaded blade shown. 14. Find the 'Z' section centred shown. 15. Find the centroid of the following shaded plane area shown on the fig tree? 16. Find the centroid of the following shaded flat area shown on the fig tree? 17. Find the centroid of the following shaded flat area shown on the fig tree? 18. Derive the expression to the centerid of the triangle? 19. A block of wood n rests on a horizontal plane as shown in fig. Determine the strength P needed to only impendir movement. Take the weight of the block as 100N and the coefficient of friction $\mu=0.4$. 20. A force of 100N acts, as shown in fig, in a block of 30.6 Kg in a tilted plane. The coefficient of friction between the block and the plane is $\mu = 0.25$ and $\mu k=0.20$ respectively. Determine whether the block is in balance and find the value of the friction force. Take $g=9.81$ msec/2. 21. A 4m length ladder weighing 200N is placed against a vertical wall, as shown in fig, the coefficient of friction between the ladder and the floor is 0.2 and that between the ladder and the floor is 0.3. The ladder beyond its own weight has distance of 3m from A. Calculate the mininum horizontal force to be applied in A to prevent slip. UNIT-III SHORT ANSWER 1. To differ between the moment of the Mass of inertia and the moment of the area of inertia 2. Define the polar moment of inertia 3. Set the time of the inertia area. 4. What is understood by the mass moment of inertia. Five. Define the product of inertia. 6. Set the theorem of the parallel axis. 7. What is perpendicular axis theorem? 8. Set the time of inertia 9. Set the Turning Radius 10. Set the Moment of Inertia. . Derive the expression for the momentinertia mass of a uniform thin rod on a shaft. .3. ahnil-oter otnemivom o anifeD .2 smret sod oĒĀĀareleca a e edadicolev a .sĀĀrof a anifeD .1 VI-edadim ad atruc atsposer ed satnugreP .raluric calip amu ed aicr \odot Āni ed assam me otnemom o enimretdE .31 .esab A olealarap e edadicivarg ed ortnec olep assap euq oxiu mu erbos raluignairt oĒĀĀes ad aicr \odot Āni ad otnemom o enimretdE 21 .Y e X soxie so erbos aicr \odot Āni ad otnemom o eluclacĀ .Āif an odartsonm adaeRbm os aer;Ā a arapĀ .11 latnoziroh ediĀrtnec oxiu o erbos aicr \odot Āni ad otnemom o ertnocnE 01 latnoziroh ediĀrtnec oxiu o erbos aicr \odot Āni ad otnemom o ertnocnE 9 P Ā esab a erbos e latnoziroh ladiortnec oxiu o erbos aicr \odot Āni ad otnemom o ertnocnE .8 .arugif an odartsonm omoc .siadiortnec soxie sues erbos wollah raluric oĒĀĀes amu ed aicr \odot Āni ad otnemom o animretdE }bl x oxiu od onrot me adaeRbm os aer;Ā ad aicr \odot Āni ed otnemom O o eluclac }a .7 .ecaf atsed 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