Code No. : 3317/N

FACULTY OF ENGINEERING & INFORMATICS

D.E. I Year (New) (Common to all branches) (Main) Examination, June 2011

ENGINEERING MECHANIC

Time : 3 Hours I **[Max. Marks : 75**

Note : Answer all questions from Part — A. Answer any five Questiona from Part —13.

PART A **(Marks a 25)**

1. **State Lami's theorem.** **2**

What are the different conditions of equilibrium 9 **2**

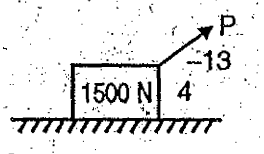
3. **State Pappu's Theorem 1 and** **3**

4. **Differentiate static friction and dynamic friction.** **2**

State perpendicular axis theorem.

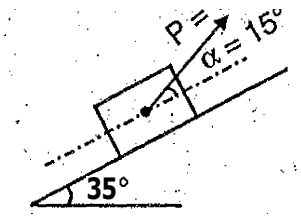
6. **The notion of a particle is defined by the relation x= t^4 12t^2 — 40. Where *x* is expressed in metres and t in sec. Determine the position velocity and acceleration when t = 5 sec.**

Determine the force P that will give the body, shown below an acceleration of 0.25 g. mise6^2. The coefficient of kinetic friction is 022.



Derive work-energy principle.

9: **A body .weighing 80 Nis pulled up on a smooth plane by a force '1≙a shown. Determipe the velocity-of jhe block -after '5 sec.** **3**



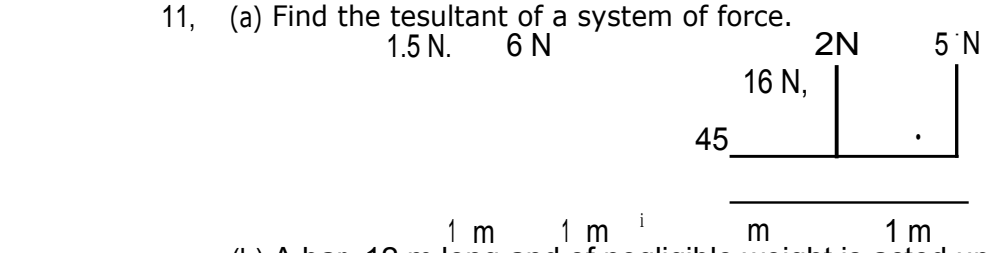
10. **Differentiate direct central impact and oblique central impact.**

(This paper contains 3 pages) **P.T.O.**

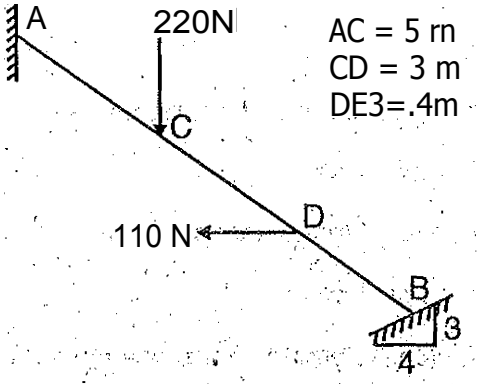
Code No 3317/N

PART — B (Marks : 50)

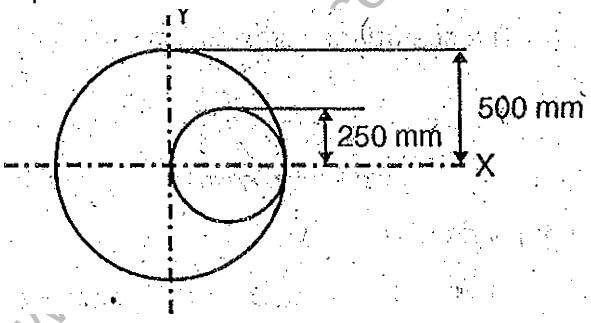
11, (a) Find the tesultant of a system of force. 5



(b) A bar. 12 m long and of negligible weight is acted upon by forces as shown in Fig. Determine angle 0 for equilibrium of bar 5



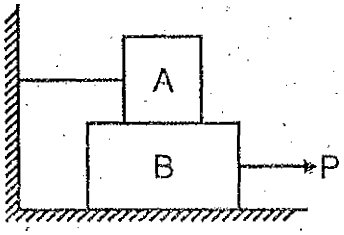
12. A circular disc of 250,mm radiue is removed from a circular disc of 500 mm radius as shown.below. Cehtre, of both lines are on same 'horizontal line, centrolq.



13. Block A weighing 1100 N rests over block E3 thaweights 2200 N as shown. Blbck A is tied to wall with a horizontal string. If M between A and B is 1/4 and between B and•floor is 1/3. What should be the value of P to move the block B if

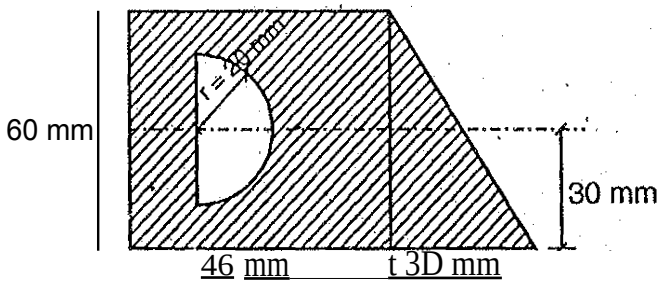
(a) P is horizontal

(b) P acts 40° upwards to horizontal ?



Code No. : 3317/N

14. Find the product of inertia for hatched area about the axes XY and y. 10



15. An elevator of gross weight of 5 kN starts to more upwards with a constant acceleration and acquires a velocity of 2 m/sec after travelling a distance of 3 m. Find the pull in cable during accelerated motion. If the elevator while stopping moves with a constant deceleration from a constant velocity of 2 misec and ,comes to rest in 2 sec. Calculate the pressure exerted by a man weighted: up: 800 N to the floor'during stopping. 10

16: Two bodies of weight W_A = 850 N and W_B = 500 N are connected to the two ends of light inextensible string, passing over smooth pulley. The weight W_A is placed on rpugh horizontal surface whose co-efficient of friction is 0.25 and W_B is hanging vertically in air. If the system is released from rest and block 'B' falls through a vertical distance of 2.5 m; dete rmine the yelocity attained by 4 13 3 10

17. (a) State the principle of impulse momentum.

(b) Three balls A, B and C masses 12.5 kg,'26 kg and 55 kg respectively move along the same straight line and in the; same direction with v,elocities of 16 m/sec, 4 m/sec and 3 m/sec. if 'A' collides with '13' and subsequently I3,! collides with C.. Find the final velocities. Assume perfectly elastic impacts.