



**MANIPAL**  
ACADEMY of HIGHER EDUCATION  
(Deemed to be University under Section 3 of the UGC Act, 1956)

# Question Paper - Report

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KENNETH FRANCIS RODRIGUES .

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Question Paper



## MANIPAL ACADEMY OF HIGHER EDUCATION

ENGINEERING MECHANICS AND SMART BUILDINGS [CIE 1073-CHM]

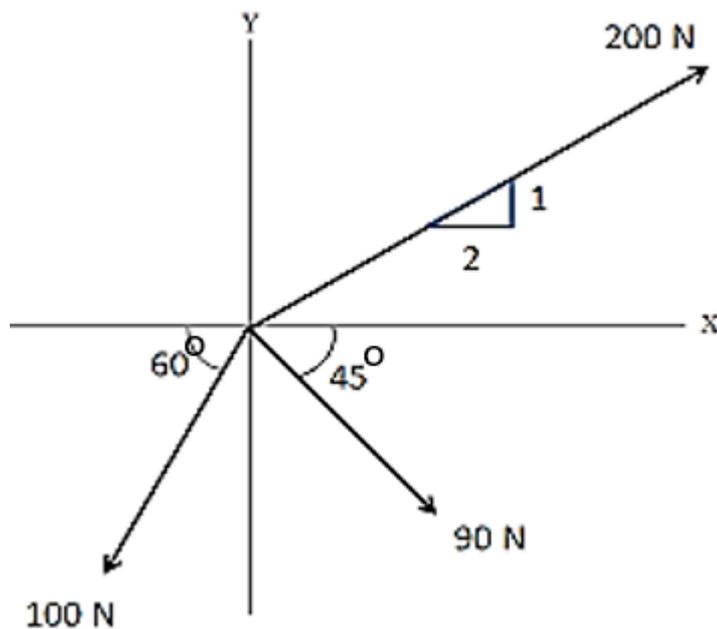
Marks: 30

Duration: 90 mins.

### DESCRIPTIVE

Answer all the questions.

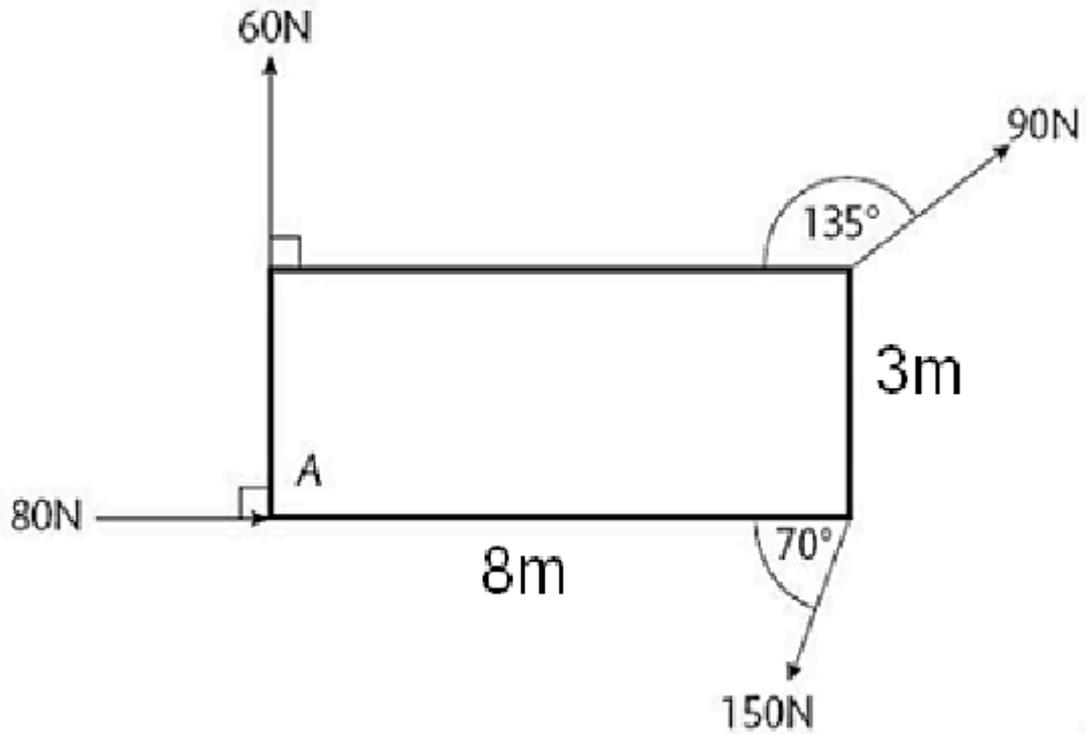
- 1) Obtain the resultant of coplanar concurrent force system shown in the figure.



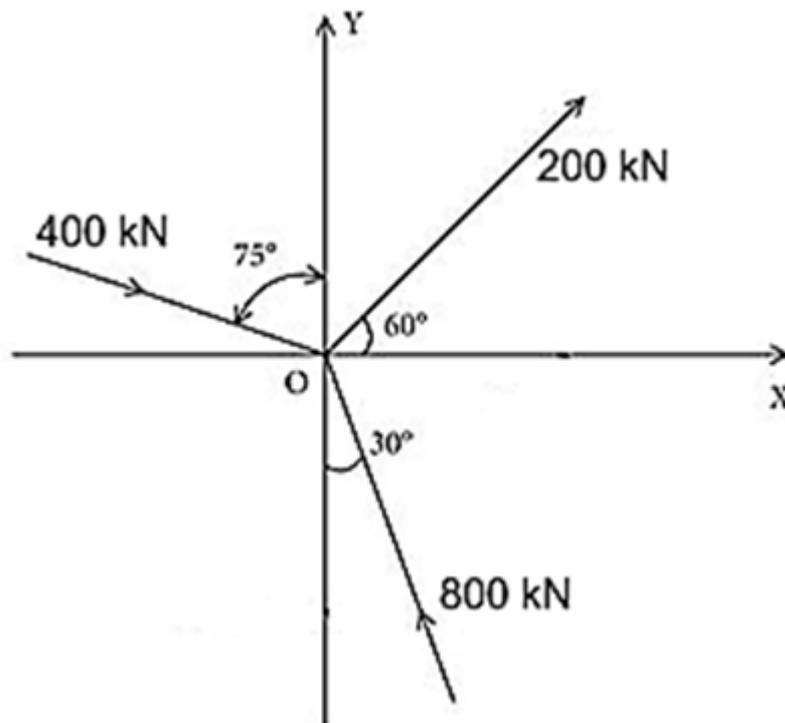
(3)

- 2) The forces acting on a rectangular plate of size 8m x 3m are shown in the figure. Locate the resultant w.r.t 'A'.

(3)



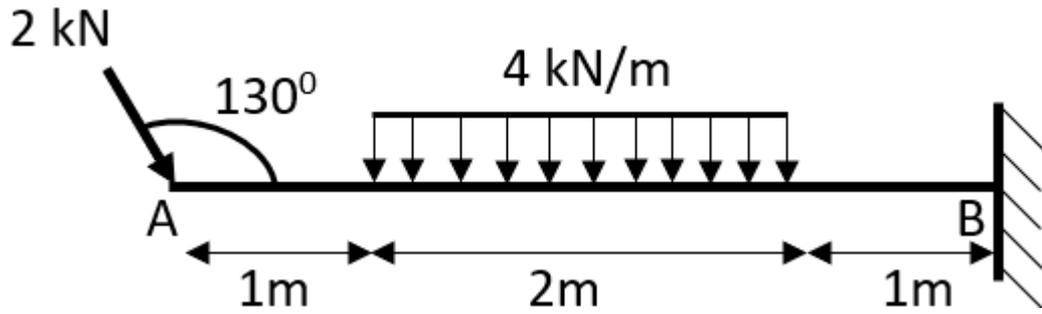
- 3) A rigid body which is subjected to four concurrent coplanar forces is in equilibrium. Three forces are shown in the figure. Find the unknown force.



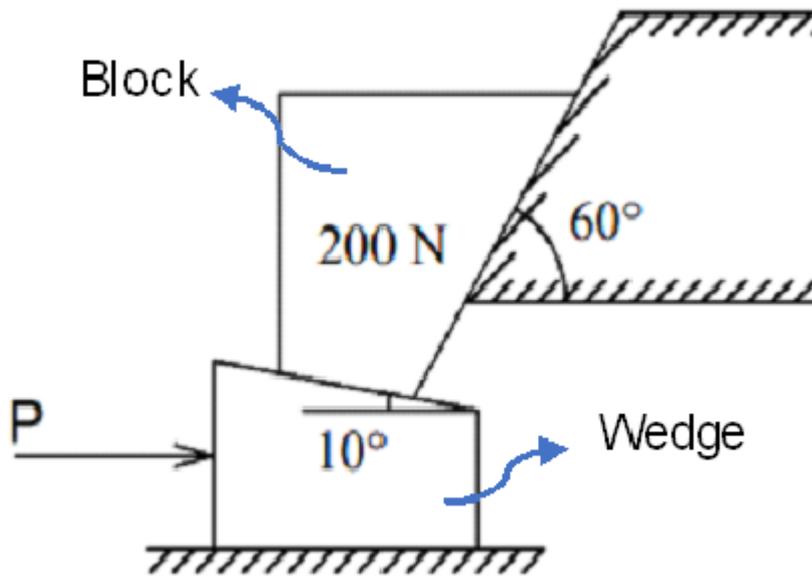
(3)

- 4) Determine support reactions for the cantilever beam AB shown in the figure.

(3)



- 5) Force 'P' is applied to a wedge to push the block of 200N up the plane as shown in the figure. Draw free body diagrams for wedge and the block. Consider angle of limiting friction at all contact surfaces as  $25^\circ$ .



(3)

- 6) Explain the importance of the following components of Air Handling unit (AHU).

(i) Air dampers

(ii) Temperature and Humidity Sensors

(iii) Return fan

(iv) Mixing Chamber

(v) Supply fan

(vi) Filters.

(3)

- 7) Explain how the functioning/malfunctioning of smart lighting system influences 'fire alarm systems' in a smart building?

(3)

- 8) Explain with a neat diagram, functioning of access control system components along with its peripheral devices in a typical door with a card reading access for entry and a request to exit facilities.

(3)

- 9) Compare IPTV and traditional TV with specific emphasis on Video on Demand, Live TV and Time shifted media. (3)
- 10) Explain the uniqueness and commonality of objectives, functioning and design of 'green buildings' and 'Smart buildings'. (3)