## National aerospace university
### "Kharkiv Aviation Institute"
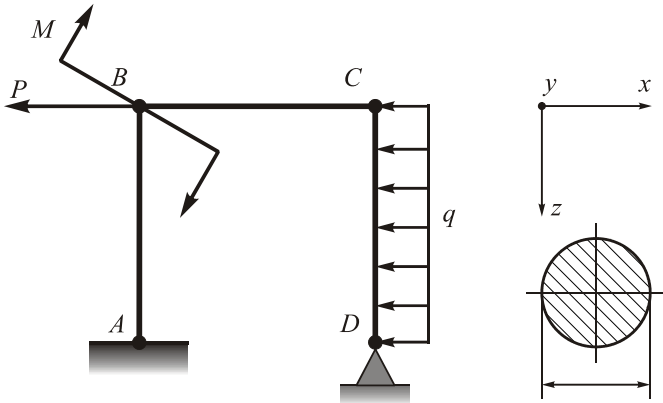### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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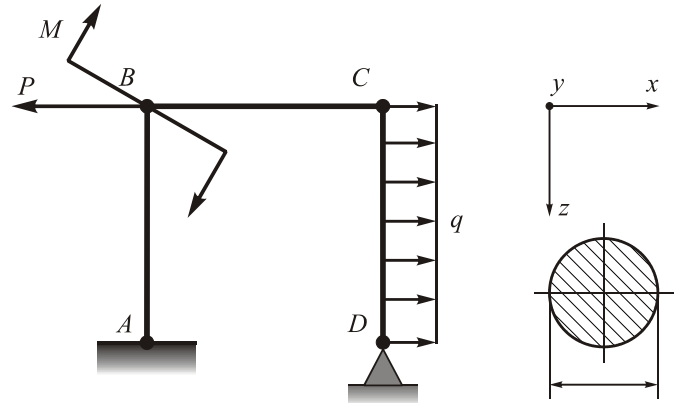**Variant: 1**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 2**                    **Complexity: 1**



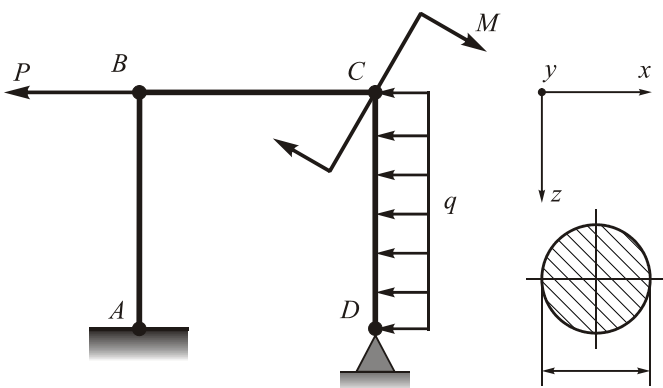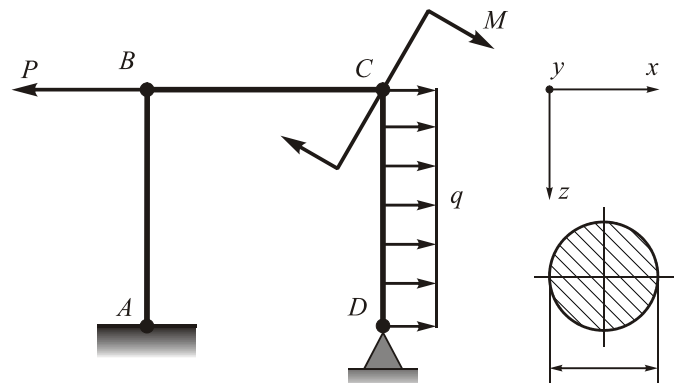**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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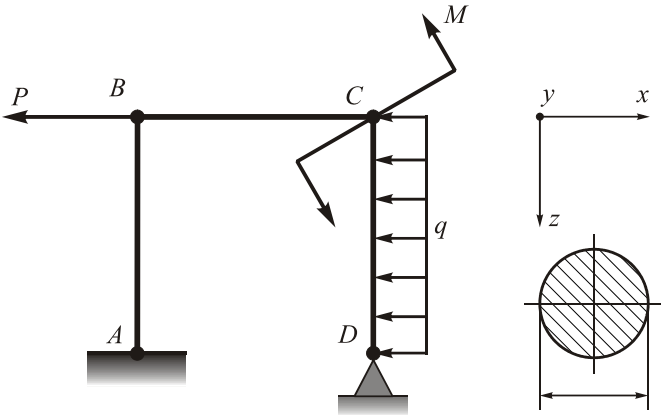**Variant: 3**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 4**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
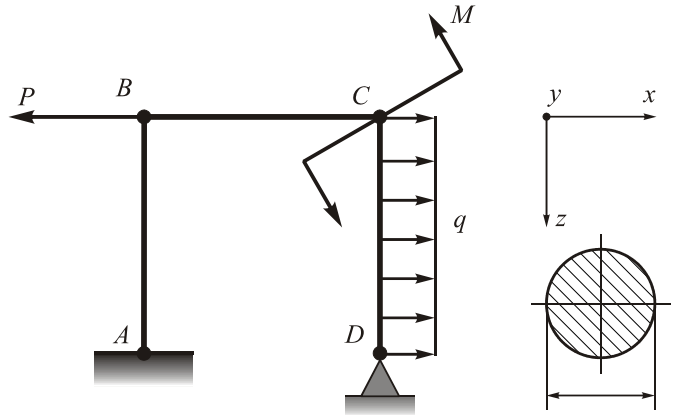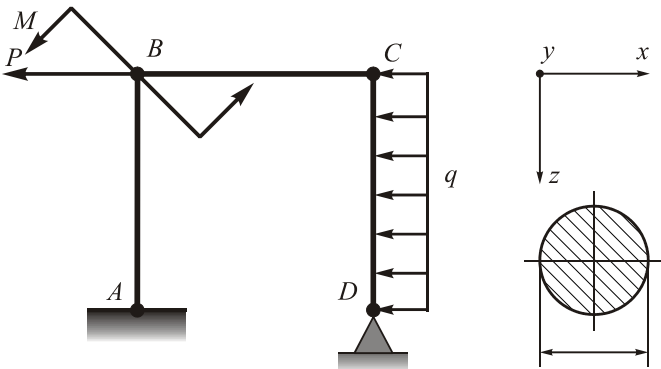
**Full name of the lecturer**                    **signature**

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**Mark:**

## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 5**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
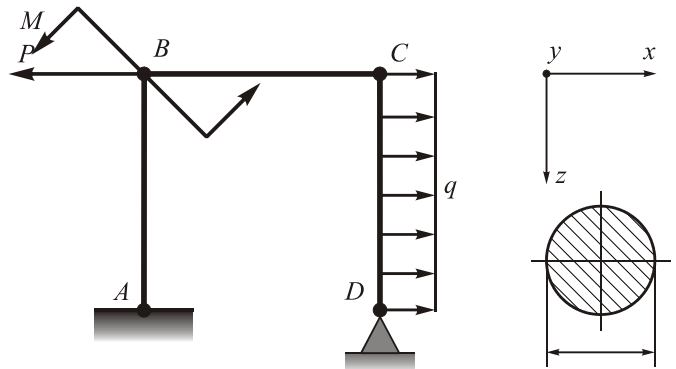**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 6**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
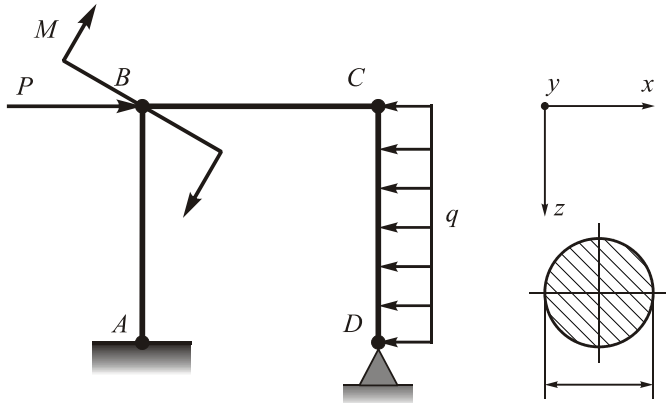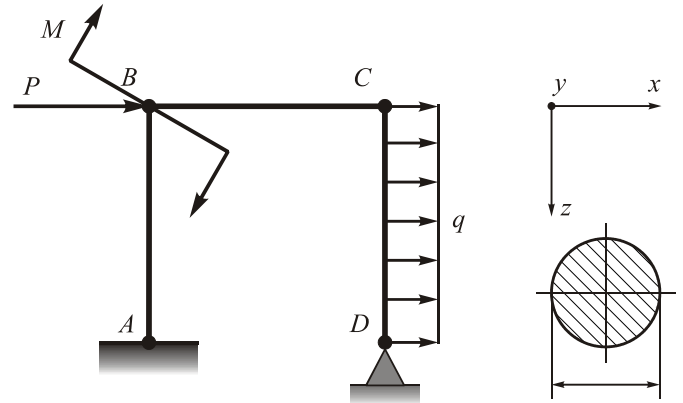
signature

**Full name of the lecturer**

**Mark:**

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## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 7**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
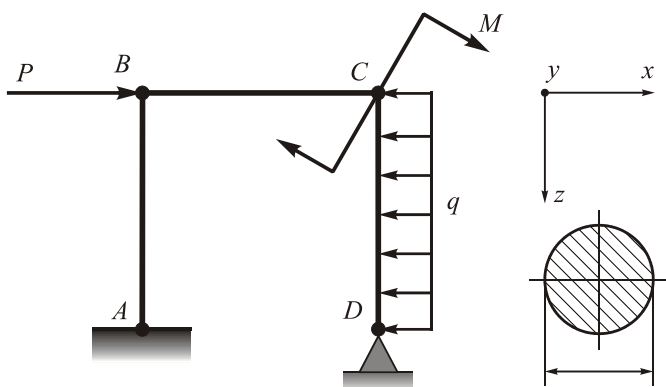**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 8**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
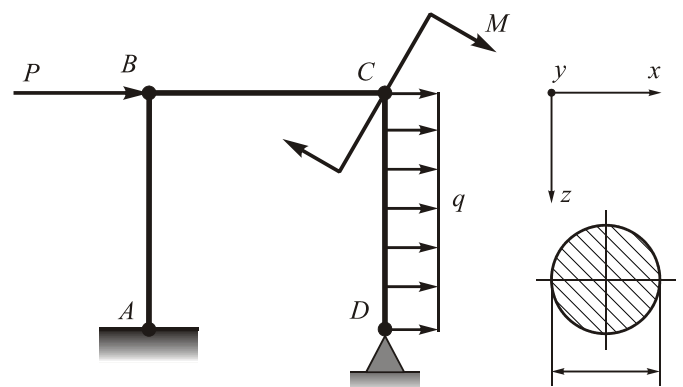
signature

**Full name of the lecturer**

**Mark:**

**Variant: 9**         **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
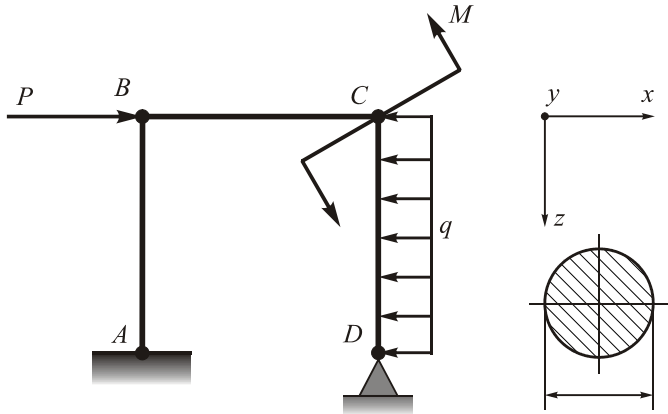
**Full name of the lecturer**

**signature**

**Mark:**

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**Variant: 10**         **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
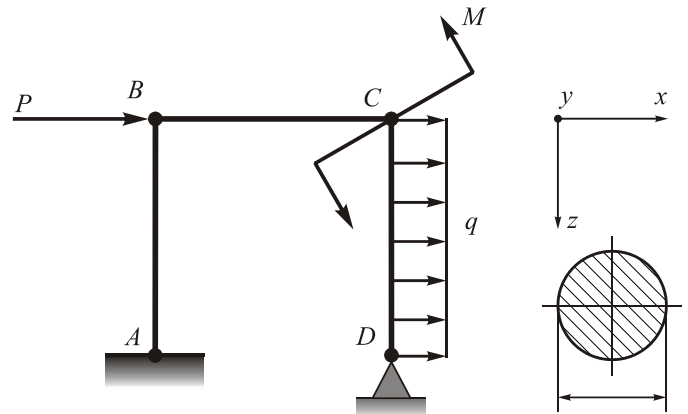**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

**signature**

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**Variant: 11**         **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

**signature**

**Mark:**

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**Variant: 12**         **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
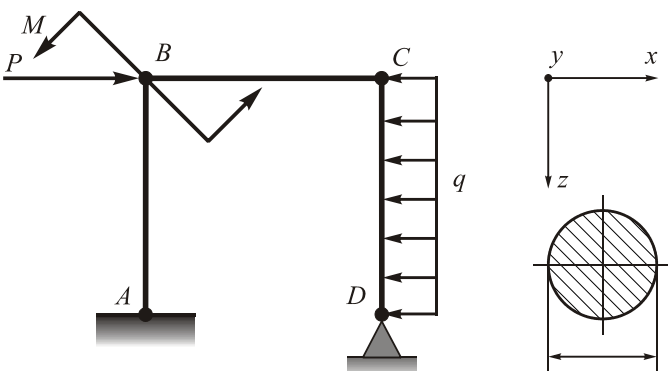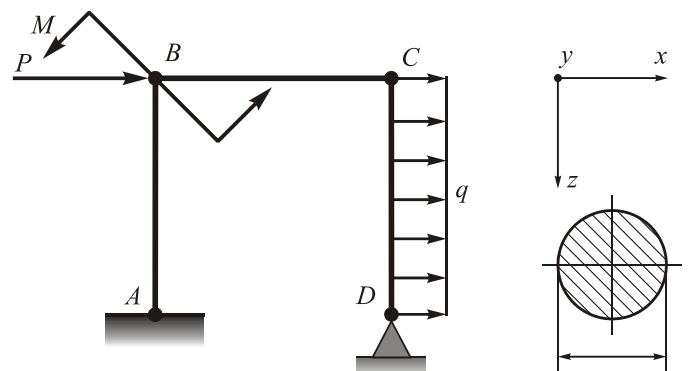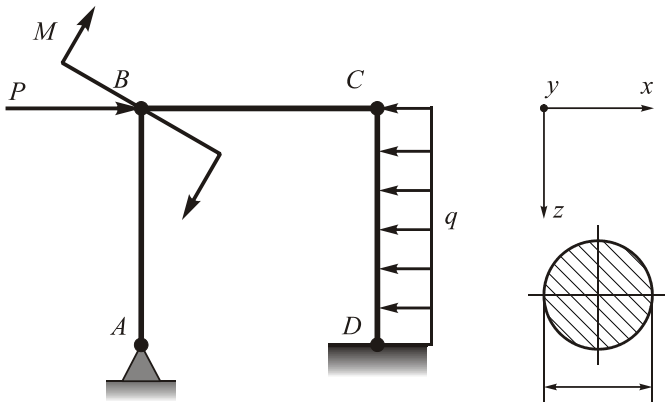
**Full name of the lecturer**

**signature**

**Mark:**

**Variant: 13**                     **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                     **signature**

**Mark:**

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**Variant: 14**                     **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                     **signature**

**Mark:**

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**Variant: 15**                     **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                     **signature**

**Mark:**

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**Variant: 16**                     **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                     **signature**

**Mark:**

**Variant: 17**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
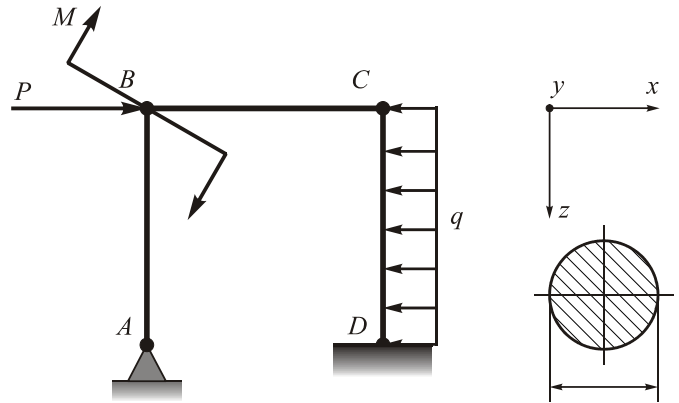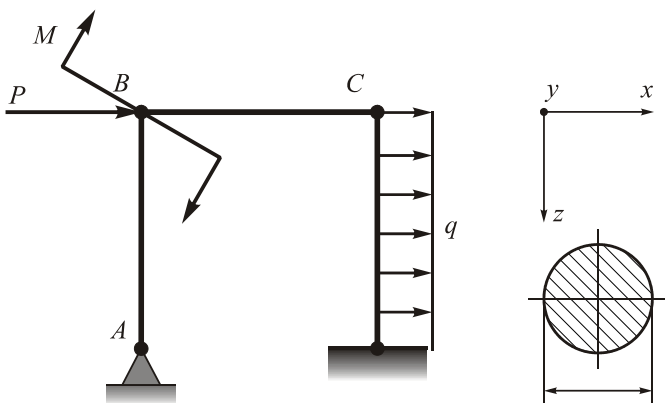$N_x(x), Q_z(x), M_y(x).$

**signature**

**Full name of the lecturer**

**Mark:**

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**Variant: 18**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x).$

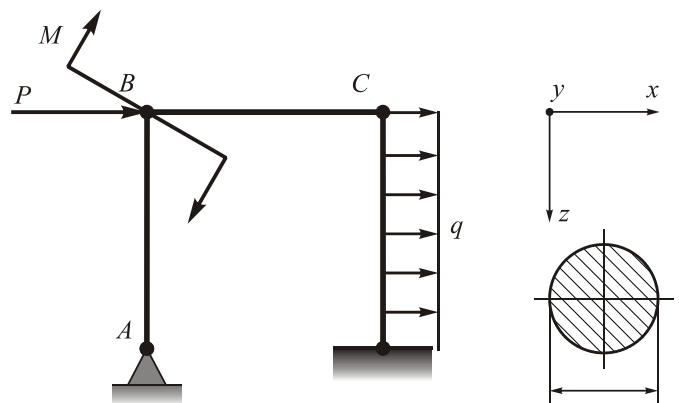**signature**

**Full name of the lecturer**

**Mark:**

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**Variant: 19**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x).$

**signature**

**Full name of the lecturer**

**Mark:**

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**Variant: 20**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
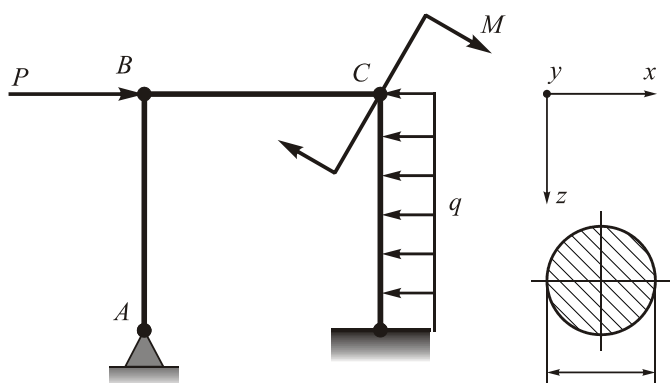$N_x(x), Q_z(x), M_y(x).$

**signature**

**Full name of the lecturer**

**Mark:**

**Variant: 21**                    **Complexity: 1**

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**Variant: 22**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
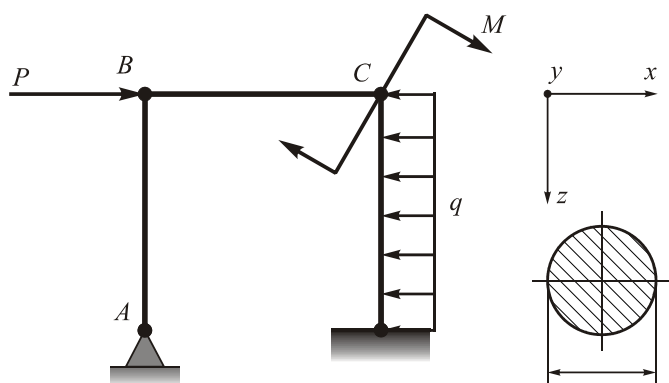
**Full name of the lecturer**                    **signature**

**Mark:**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
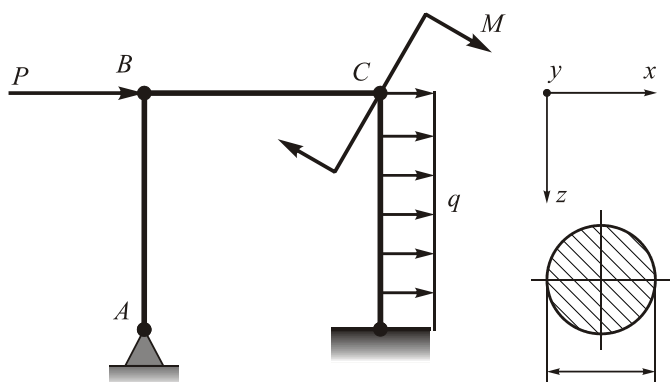
**Full name of the lecturer**                    **signature**

**Mark:**

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**"Kharkiv Aviation Institute"**
**Department of aircraft strength**

**Variant: 23**                    **Complexity: 1**

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**"Kharkiv Aviation Institute"**
**Department of aircraft strength**

**Variant: 24**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
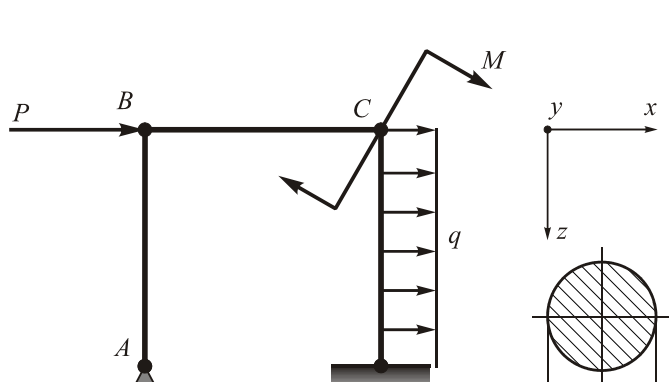
**Full name of the lecturer**                    **signature**

**Mark:**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
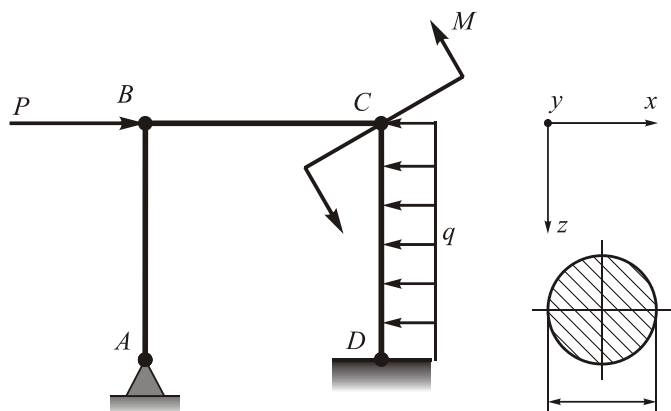
**Full name of the lecturer**                    **signature**

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**Variant: 25**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
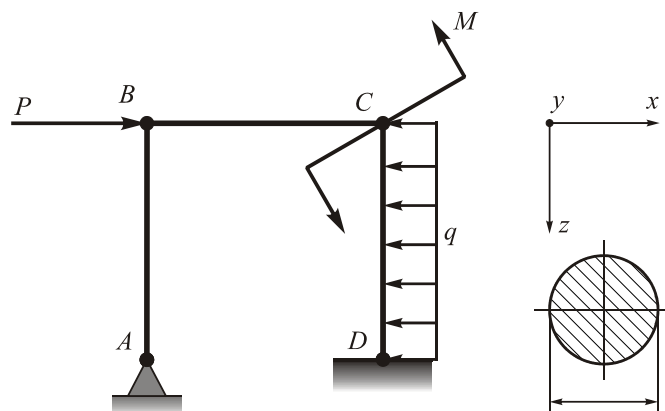**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 26**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
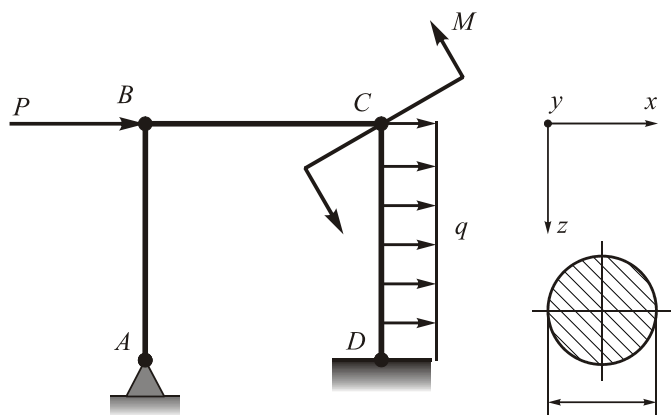
**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 27**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
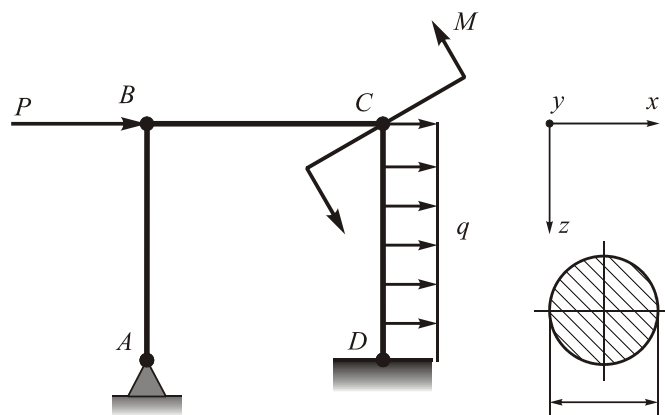
**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 28**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 29**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
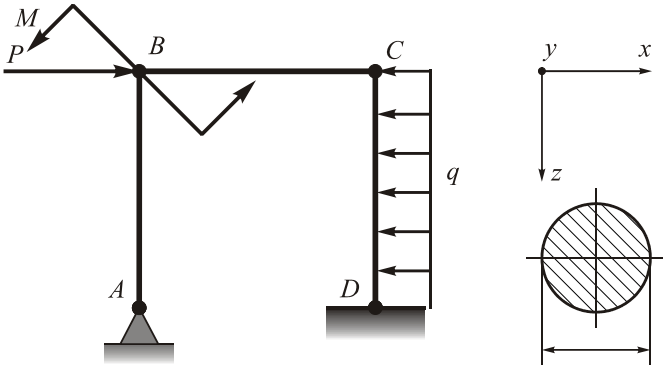**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                        **signature**
**Full name of the lecturer**

**Mark:**

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**Variant: 30**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
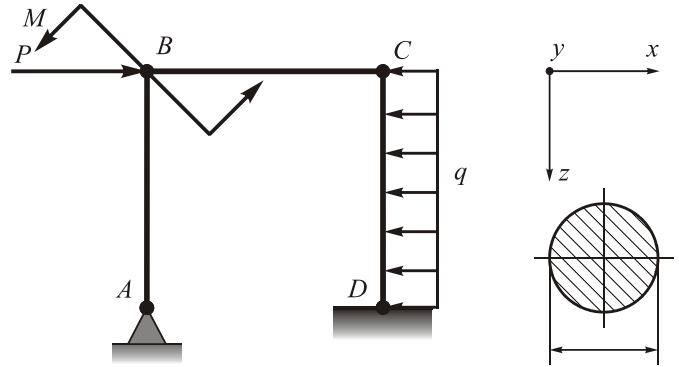**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                        **signature**
**Full name of the lecturer**

**Mark:**

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**Variant: 31**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
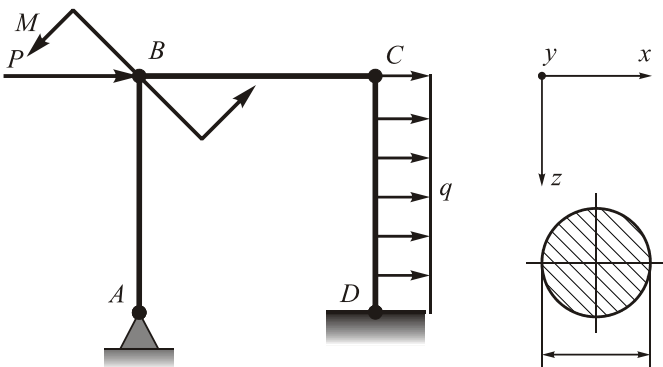**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                        **signature**
**Full name of the lecturer**

**Mark:**

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**Variant: 32**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
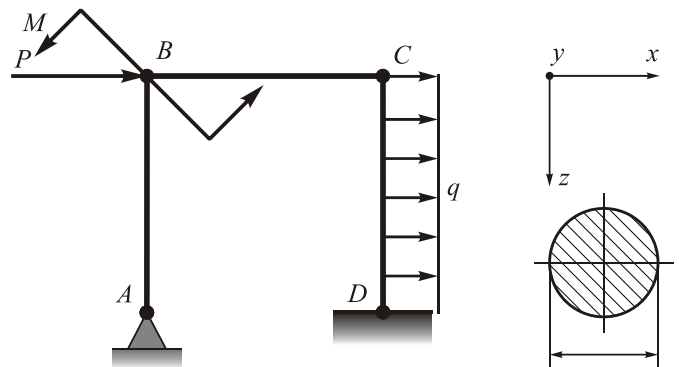**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                        **signature**
**Full name of the lecturer**

**Mark:**

**Variant: 33**                **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
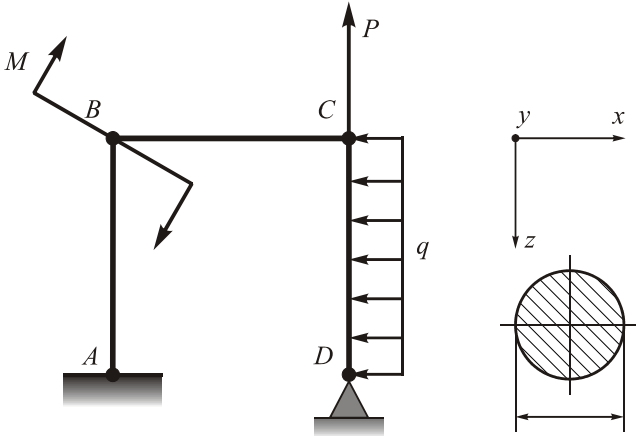**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

                                                    **signature**
**Full name of the lecturer**

**Mark:**

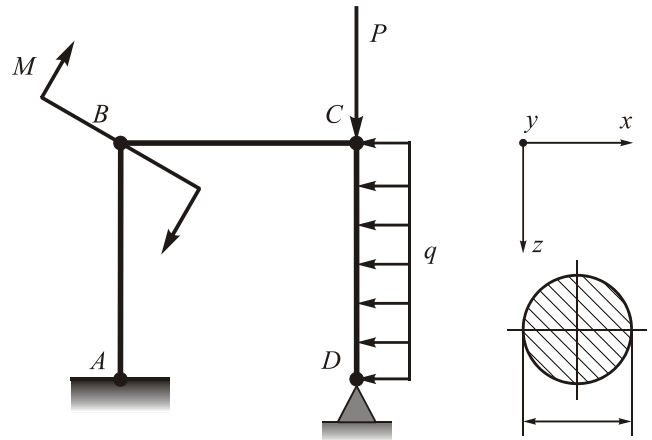**Variant: 34**                **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

                                                    **signature**
**Full name of the lecturer**

**Mark:**

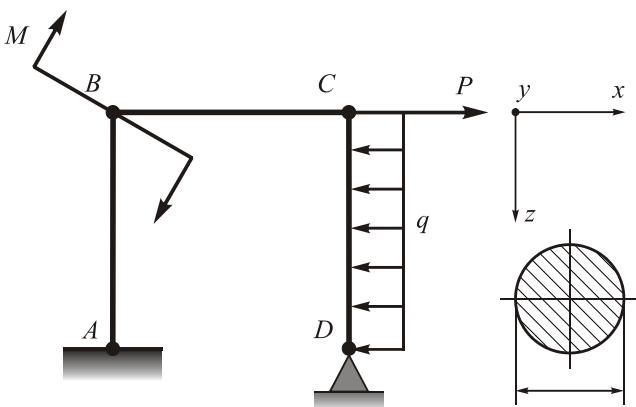**Variant: 35**                **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

                                                    **signature**
**Full name of the lecturer**

**Mark:**

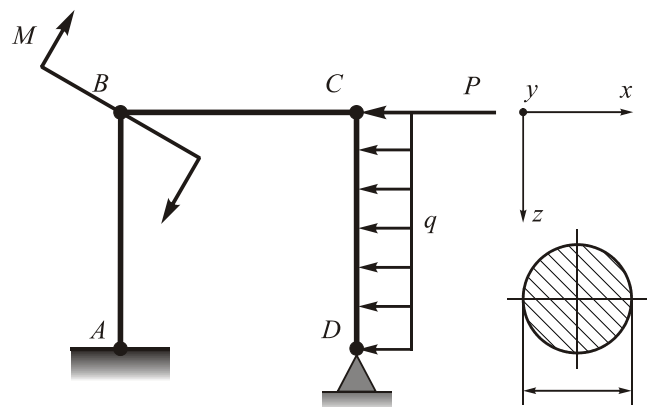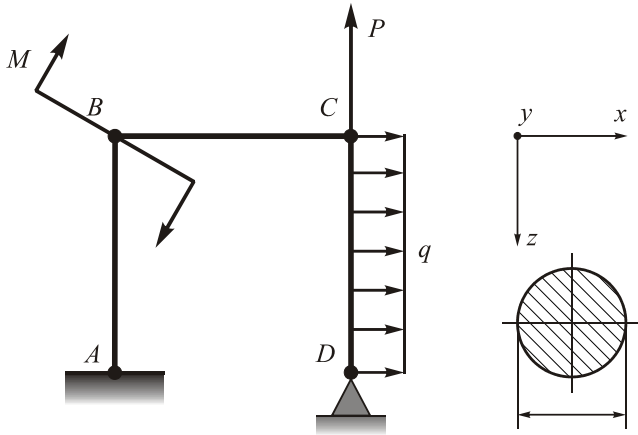**Variant: 36**                **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

                                                    **signature**
**Full name of the lecturer**

**Mark:**

**Variant: 37**               **Complexity: 1**



**Given:** $q = 10 \, \text{kN/m}; \ P = 20 \, \text{kN}; \ M = 10 \, \text{kNm}; \ l = 2 \, \text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

signature

**Full name of the lecturer**

**Mark:**

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**Variant: 38**               **Complexity: 1**



**Given:** $q = 10 \, \text{kN/m}; \ P = 20 \, \text{kN}; \ M = 10 \, \text{kNm}; \ l = 2 \, \text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

signature

**Full name of the lecturer**

**Mark:**

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**Variant: 39**               **Complexity: 1**



**Given:** $q = 10 \, \text{kN/m}; \ P = 20 \, \text{kN}; \ M = 10 \, \text{kNm}; \ l = 2 \, \text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
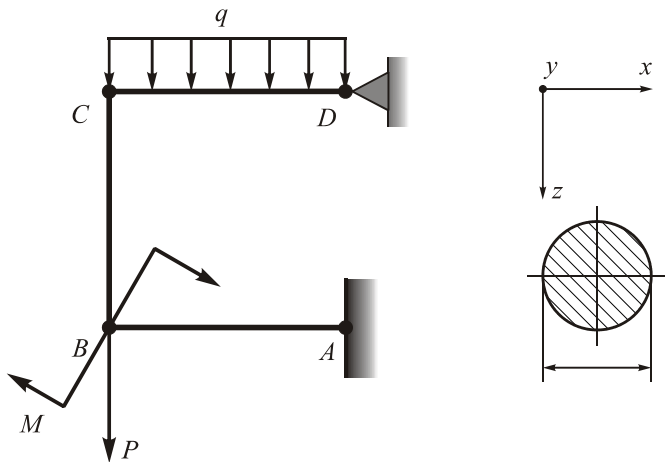
signature

**Full name of the lecturer**

**Mark:**

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**Variant: 40**               **Complexity: 1**



**Given:** $q = 10 \, \text{kN/m}; \ P = 20 \, \text{kN}; \ M = 10 \, \text{kNm}; \ l = 2 \, \text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
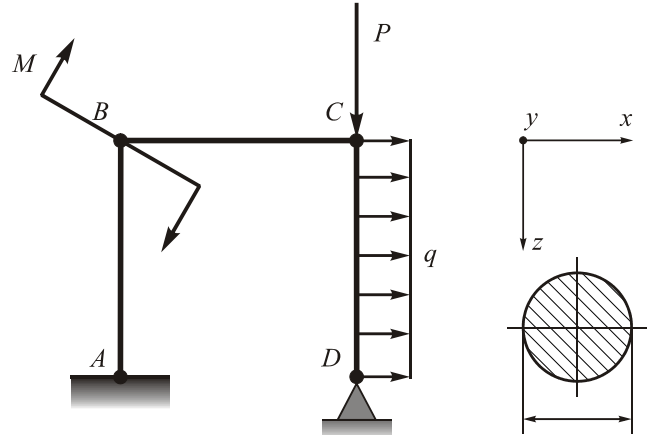
signature

**Full name of the lecturer**

**Mark:**

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**Variant: 41**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

**signature**

**Mark:**

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**Variant: 42**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

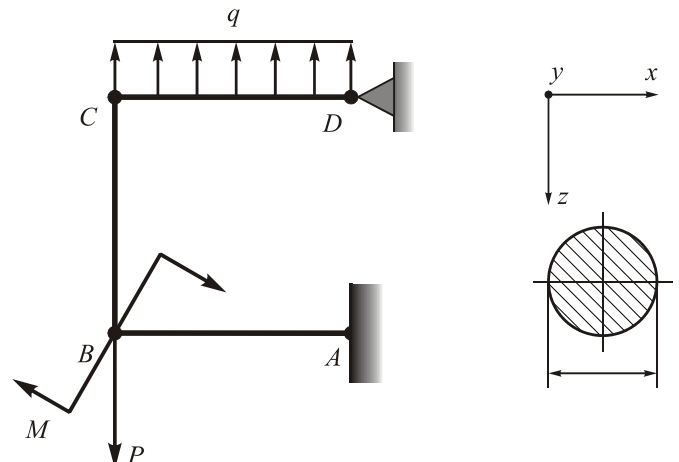**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

**signature**

**Mark:**

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**Variant: 43**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

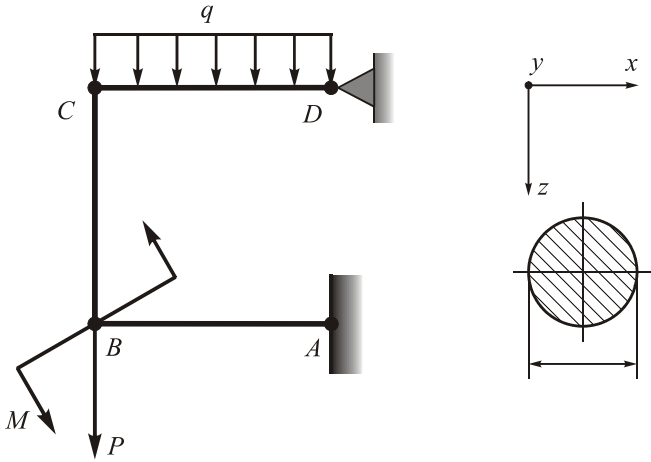**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

**signature**

**Mark:**

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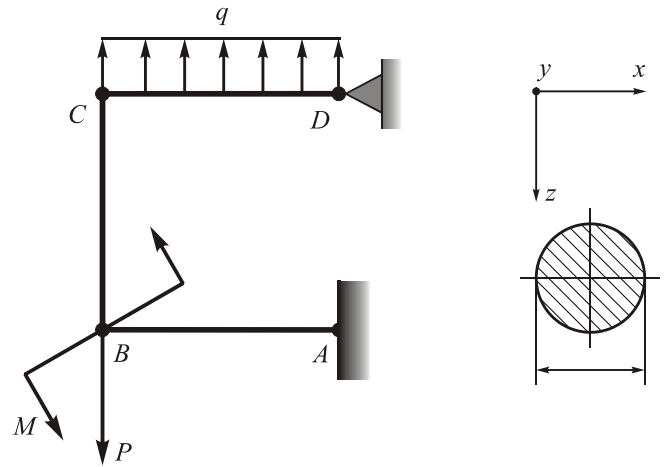**Variant: 44**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

**signature**

**Mark:**

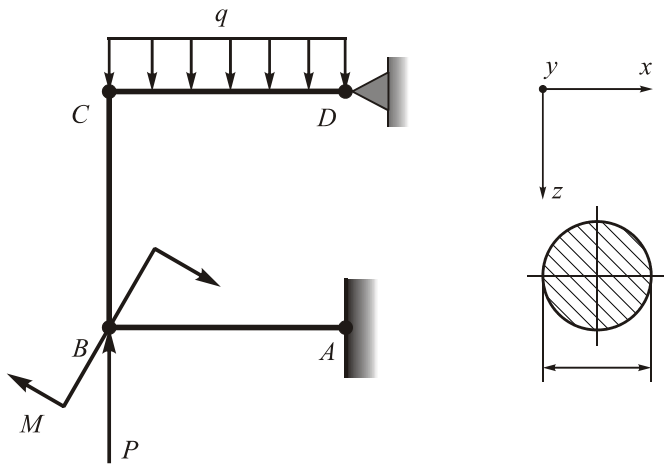**Variant: 45**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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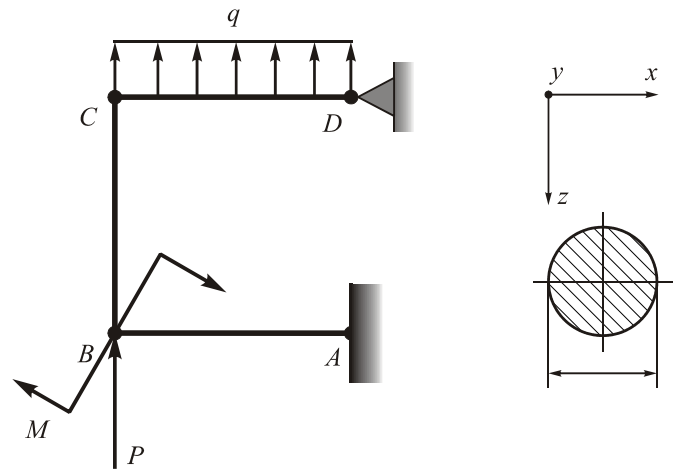**Variant: 46**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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**Variant: 47**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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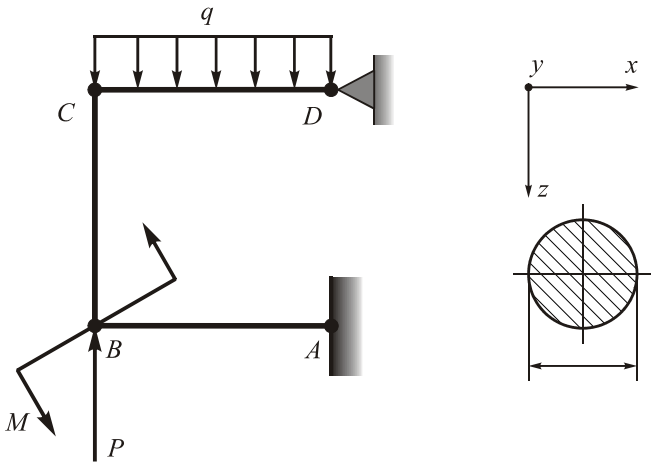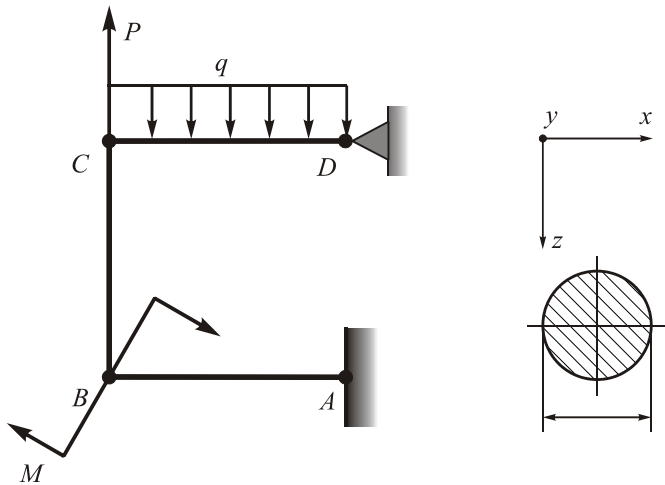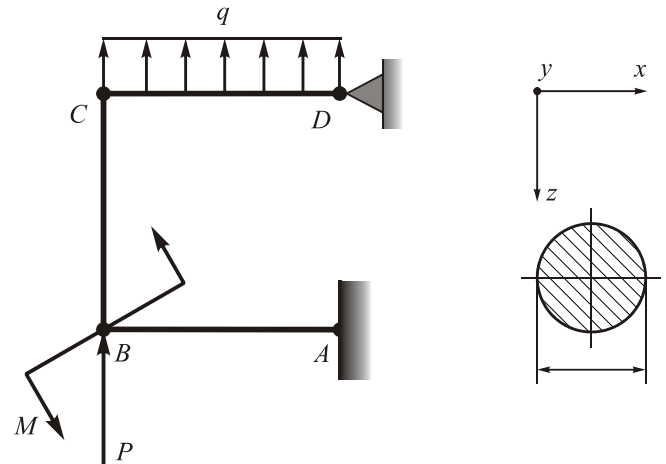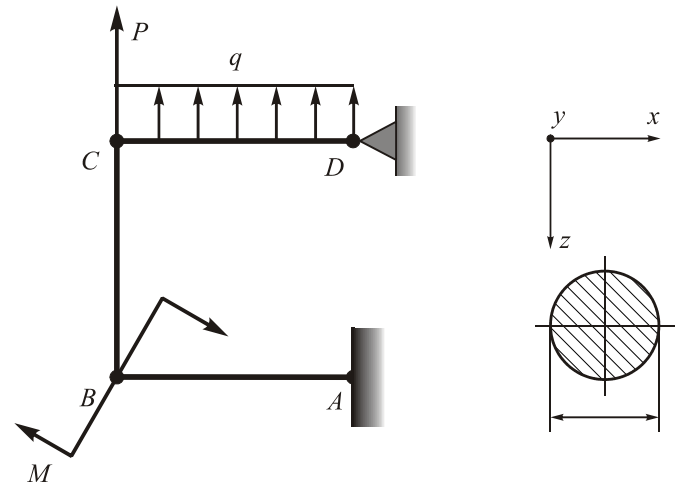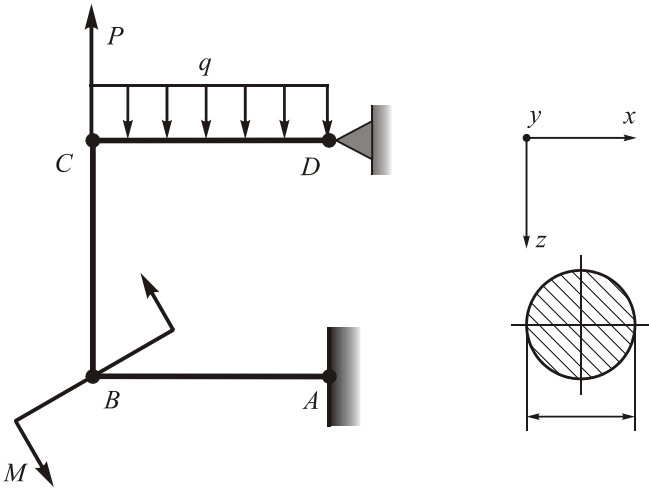**Variant: 48**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 49**               **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 50**               **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 51**               **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 52**               **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 53**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\; P = 20\,\text{kN};\; M = 10\,\text{kNm};\; l = 2\,\text{m}.$
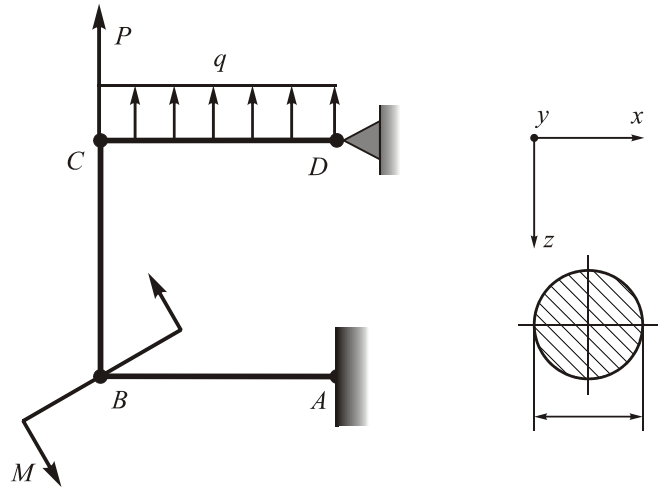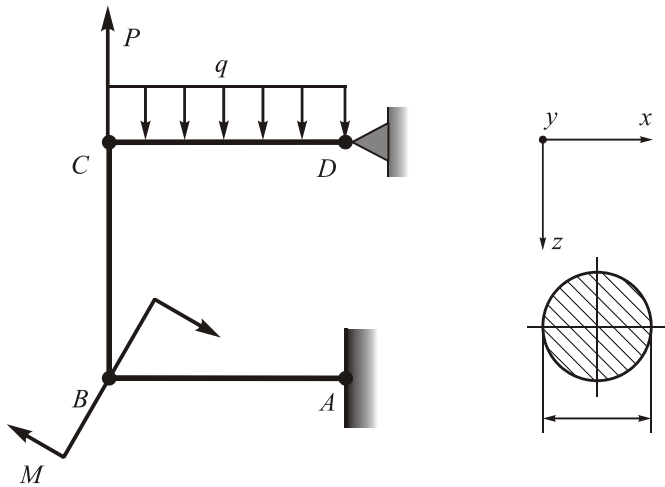**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                                 **signature**

**Mark:**

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**Variant: 54**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\; P = 20\,\text{kN};\; M = 10\,\text{kNm};\; l = 2\,\text{m}.$
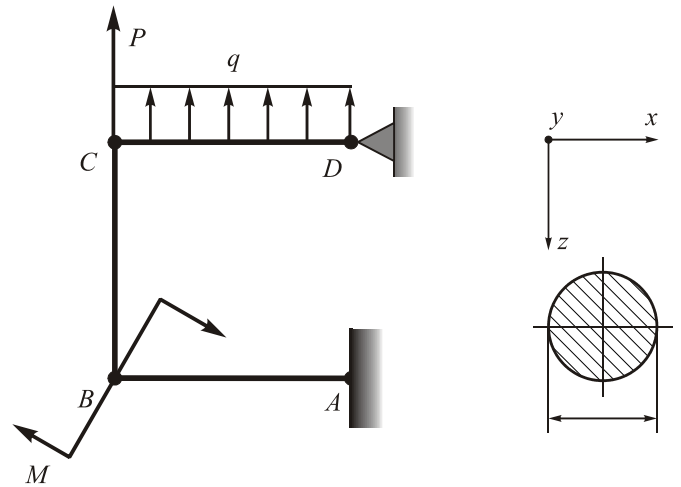**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                                 **signature**

**Mark:**

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**Variant: 55**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\; P = 20\,\text{kN};\; M = 10\,\text{kNm};\; l = 2\,\text{m}.$
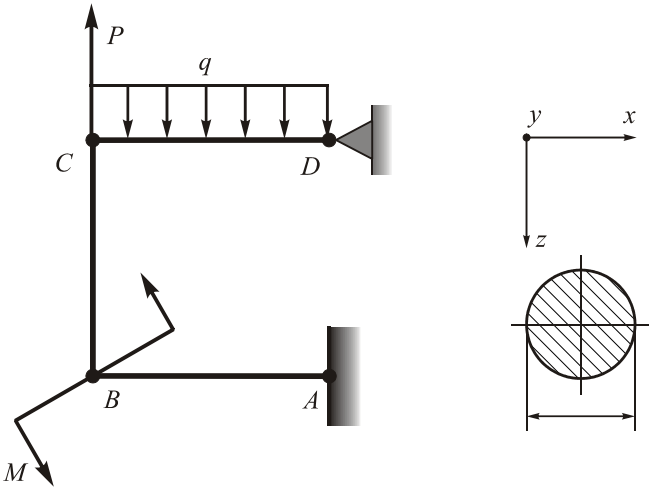**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                                 **signature**

**Mark:**

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**Variant: 56**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\; P = 20\,\text{kN};\; M = 10\,\text{kNm};\; l = 2\,\text{m}.$
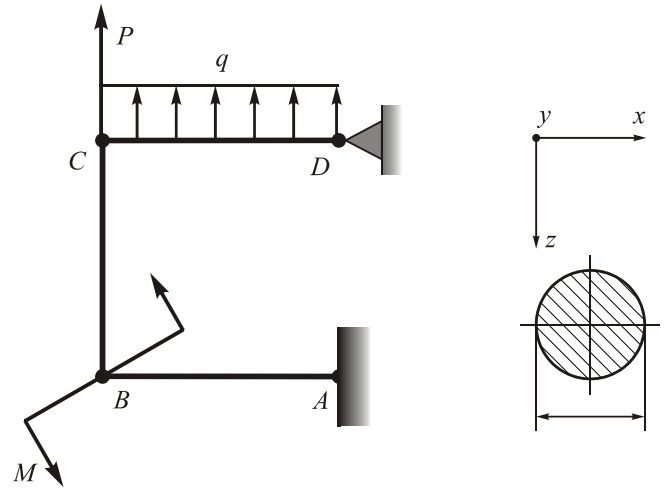**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                                 **signature**

**Mark:**

## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 57**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
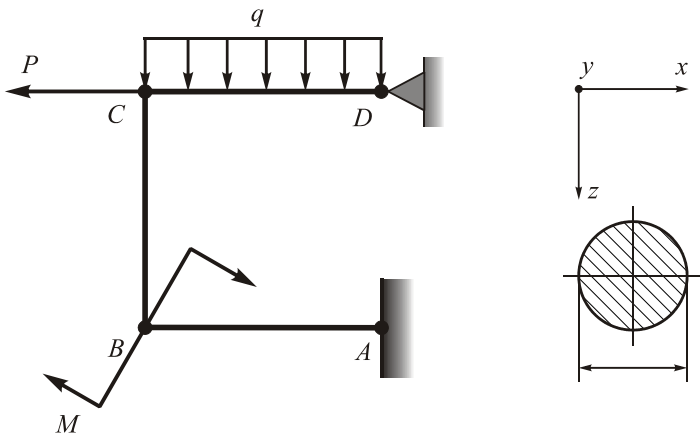
**Full name of the lecturer**                    **signature**

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**Mark:**

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## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 58**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
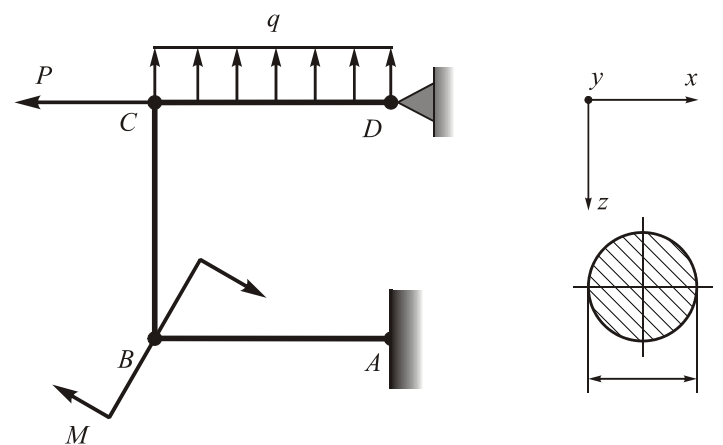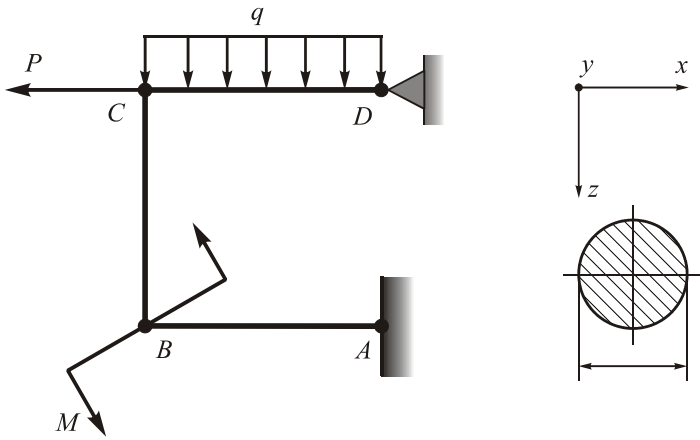**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

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## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 59**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
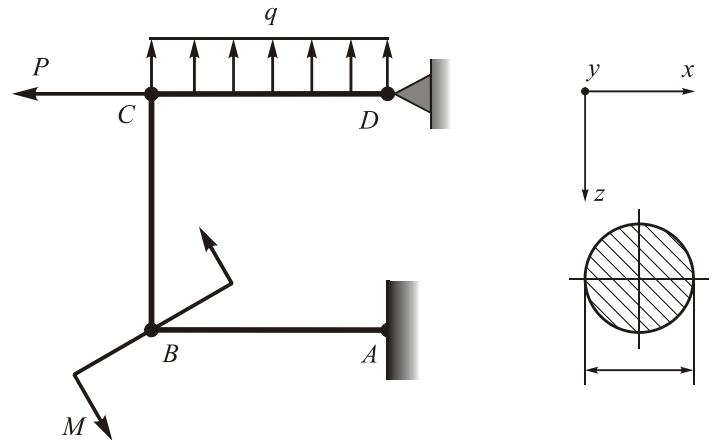
**Full name of the lecturer**                    **signature**

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**Mark:**

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## National aerospace university
### "Kharkiv Aviation Institute"
### Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 60**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
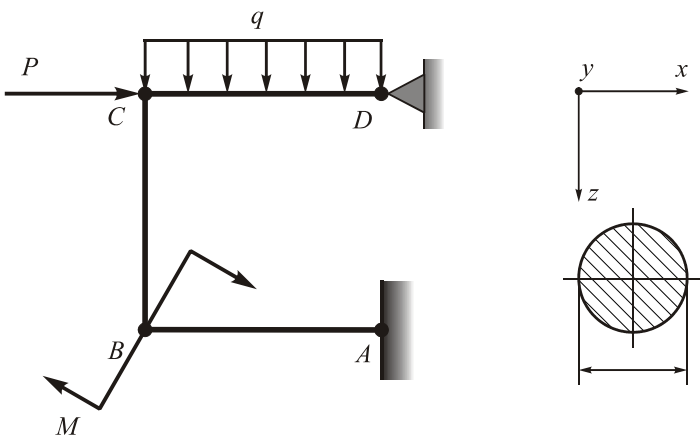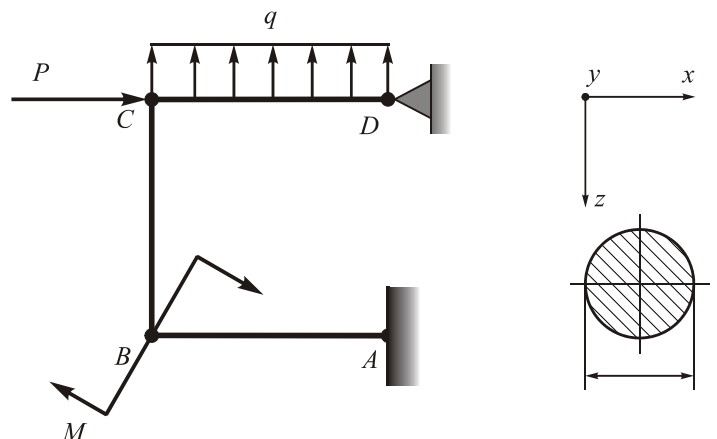
**Full name of the lecturer**                    **signature**

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**Mark:**

**Variant: 61**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Variant: 62**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
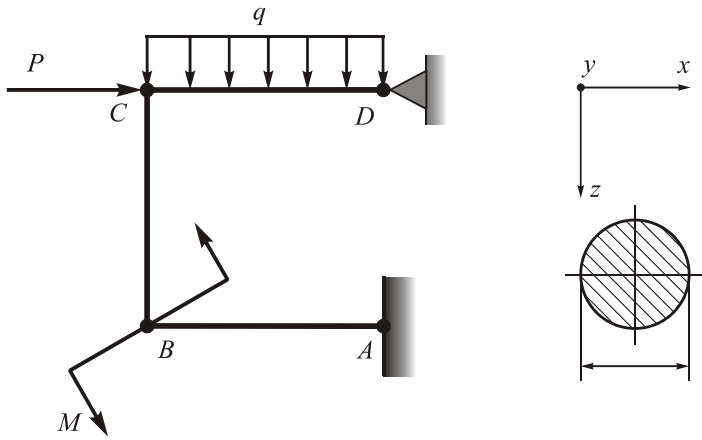**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

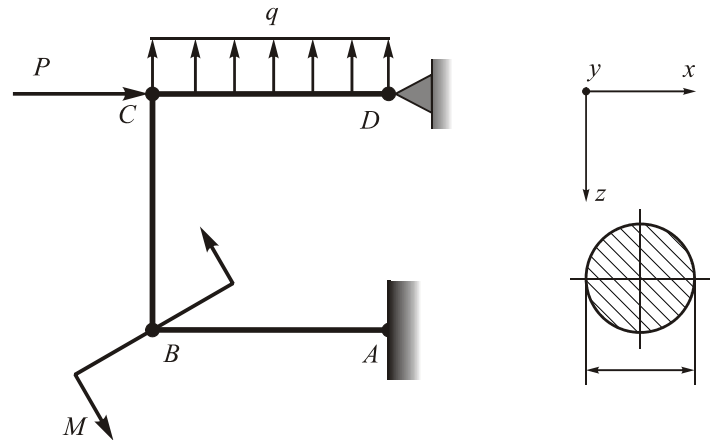**Variant: 63**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Variant: 64**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

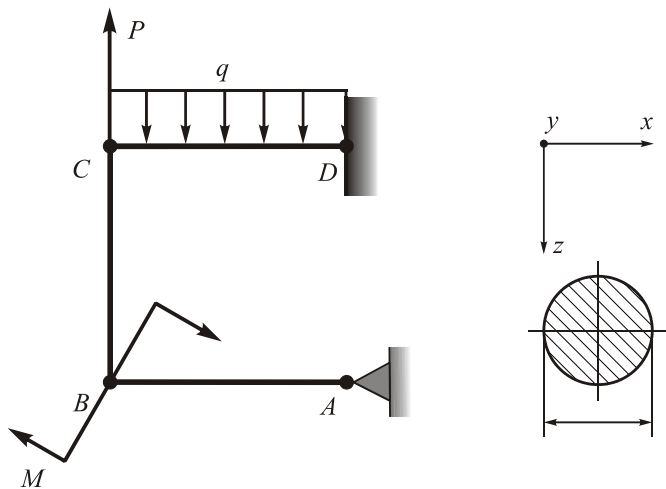**Variant: 65**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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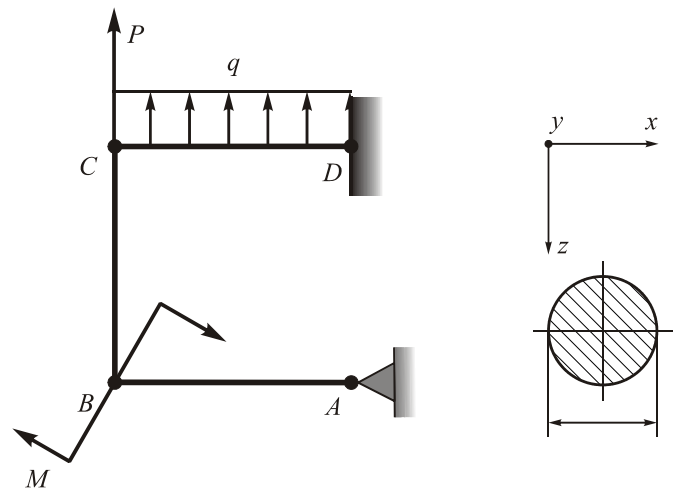**Variant: 66**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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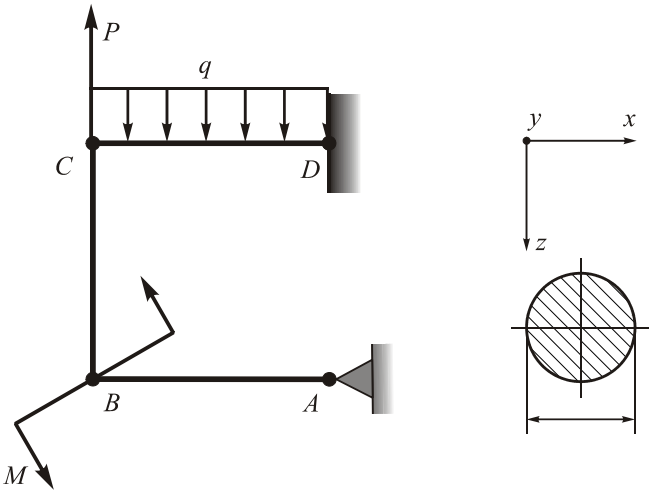**Variant: 67**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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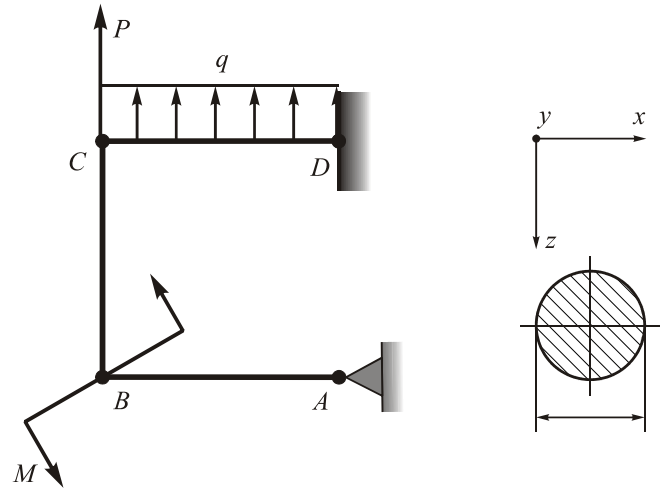**Variant: 68**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 69**                          **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                          **signature**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
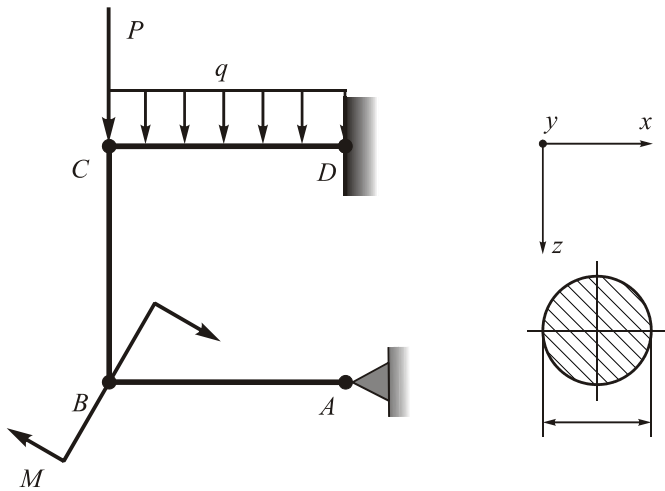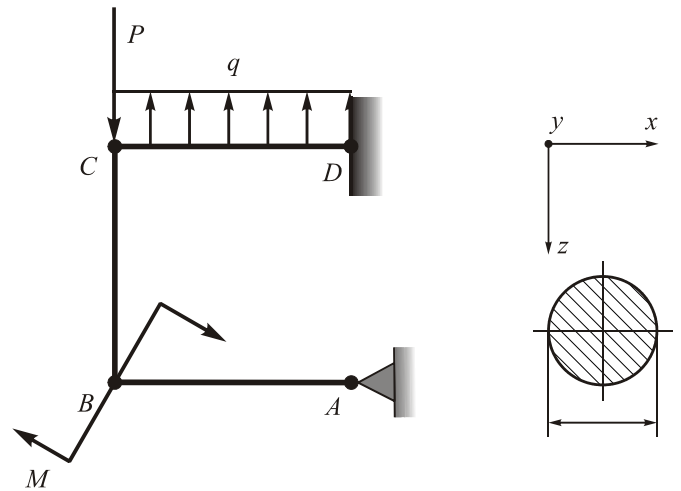**Full name of the student, group**

**Variant: 70**                          **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                          **signature**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
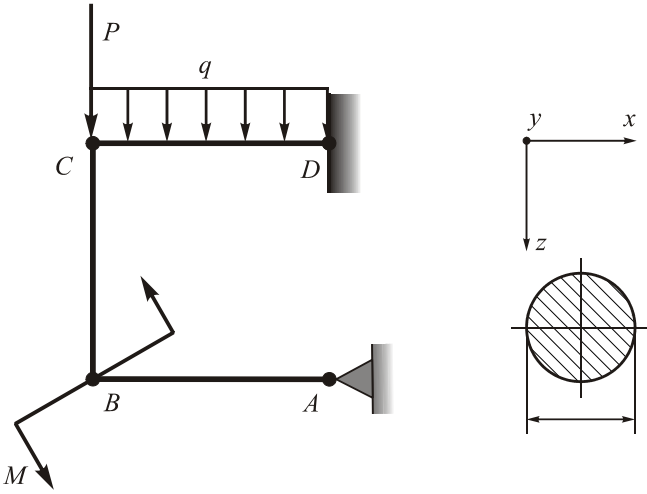**Full name of the student, group**

**Variant: 71**                          **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                          **signature**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
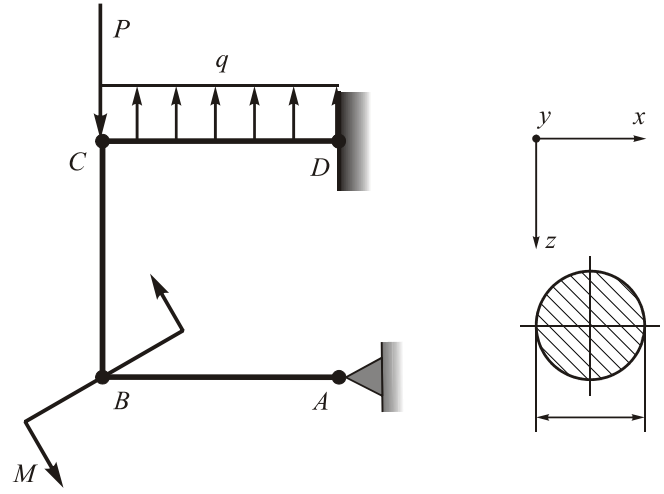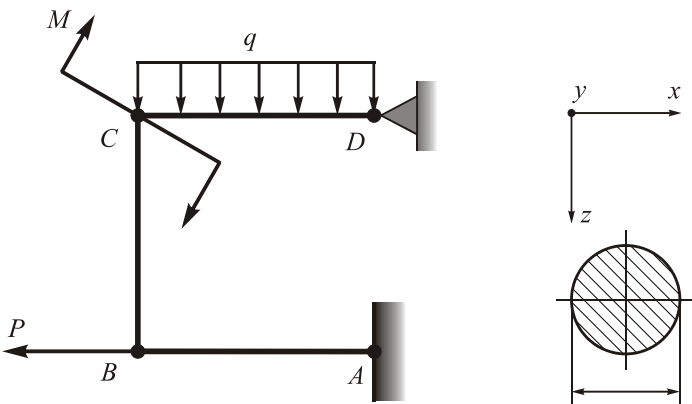**Full name of the student, group**

**Variant: 72**                          **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                          **signature**

**Mark:**

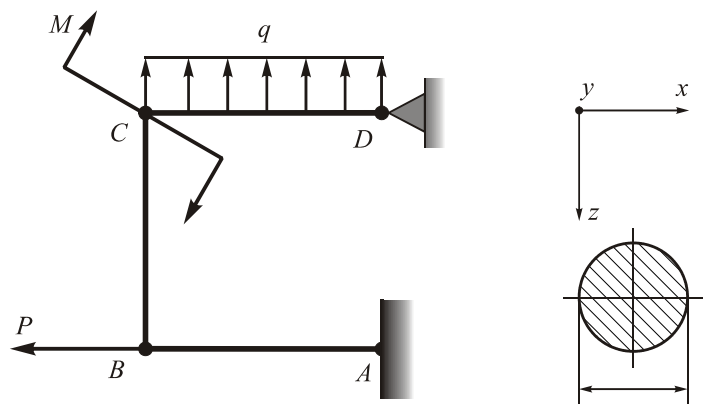**Variant: 73**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 74**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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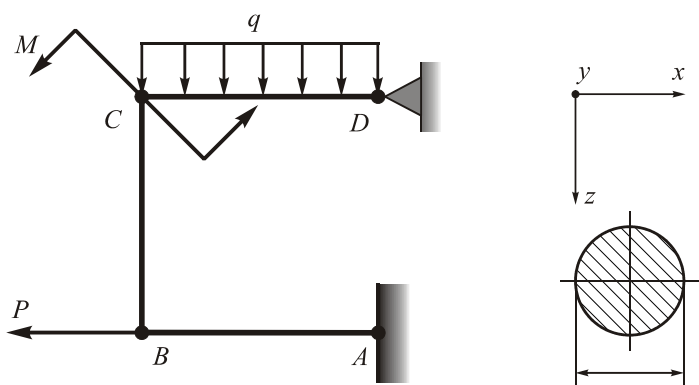**Variant: 75**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 76**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
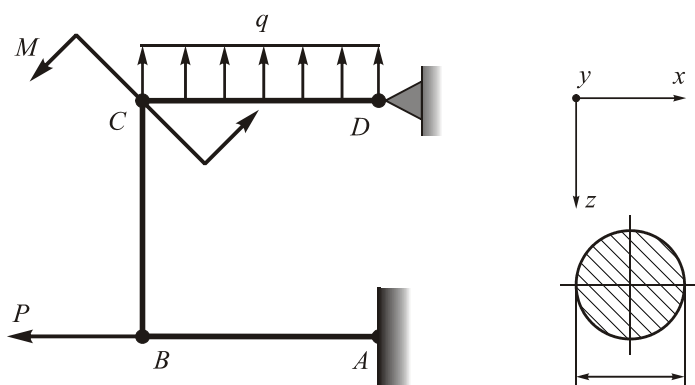**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 77**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
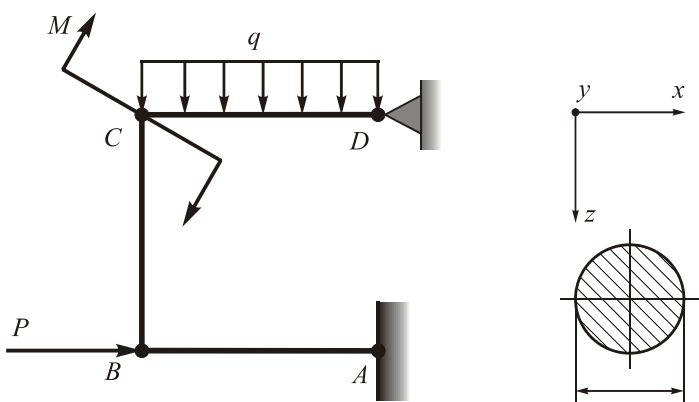**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 78**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 79**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
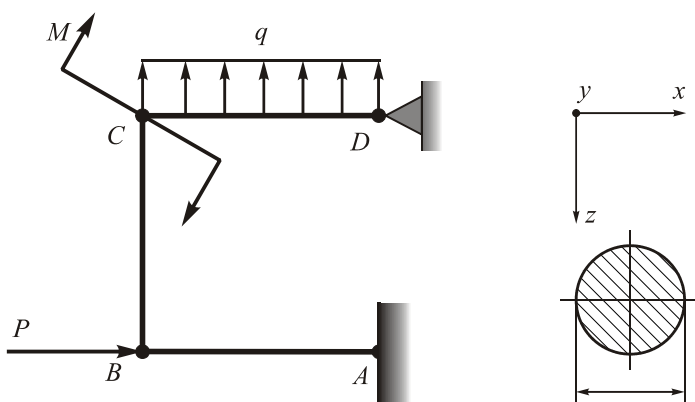
**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 80**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
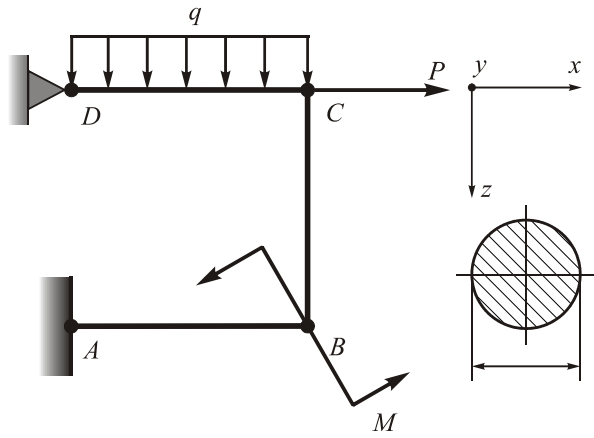
**Full name of the lecturer**                    **signature**

**Mark:**

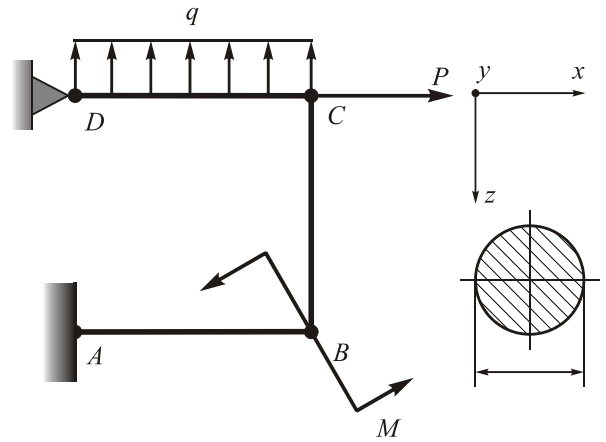**Variant: 81**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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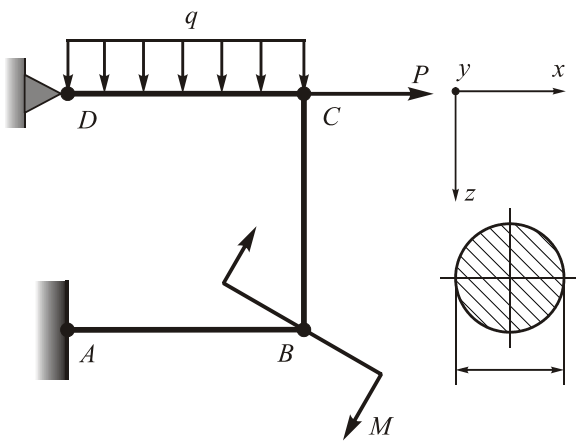**Variant: 82**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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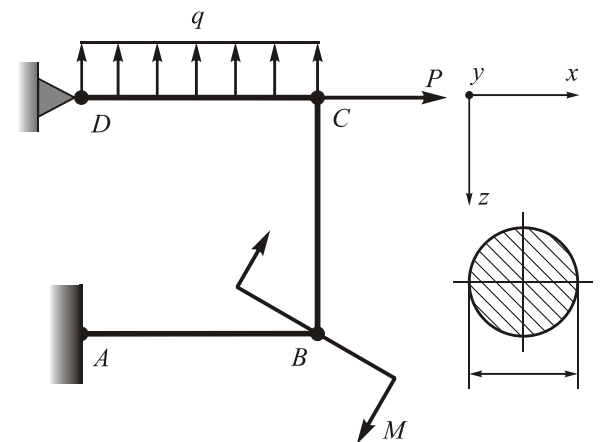**Variant: 83**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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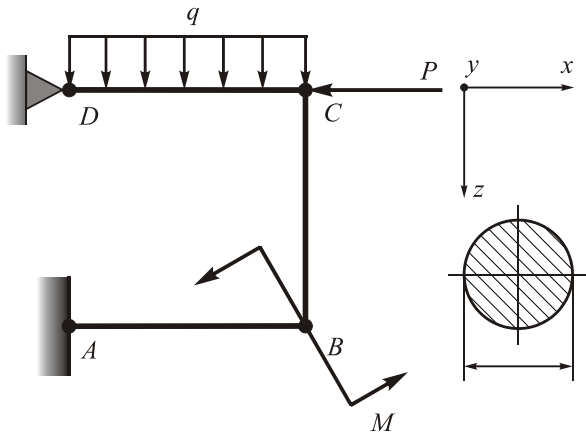**Variant: 84**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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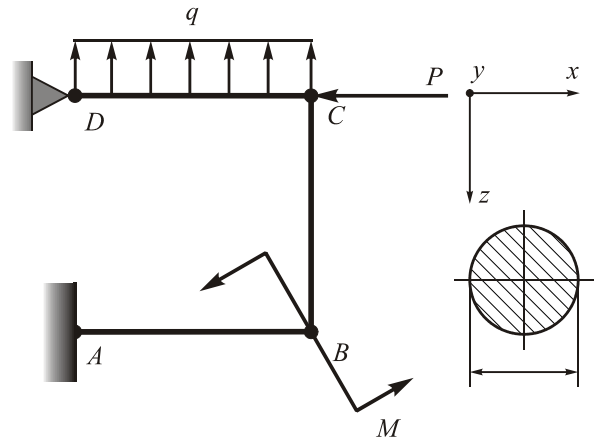**Variant: 85**                    **Complexity: 1**



**Given:** $q = 10 \,\text{kN/m}$; $P = 20 \,\text{kN}$; $M = 10 \,\text{kNm}$; $l = 2 \,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

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## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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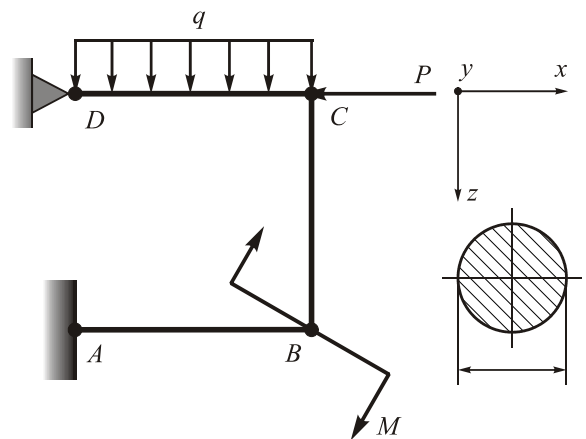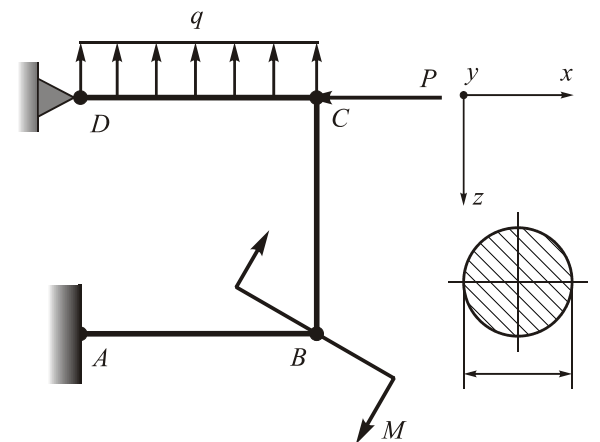**Variant: 86**                    **Complexity: 1**



**Given:** $q = 10 \,\text{kN/m}$; $P = 20 \,\text{kN}$; $M = 10 \,\text{kNm}$; $l = 2 \,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

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## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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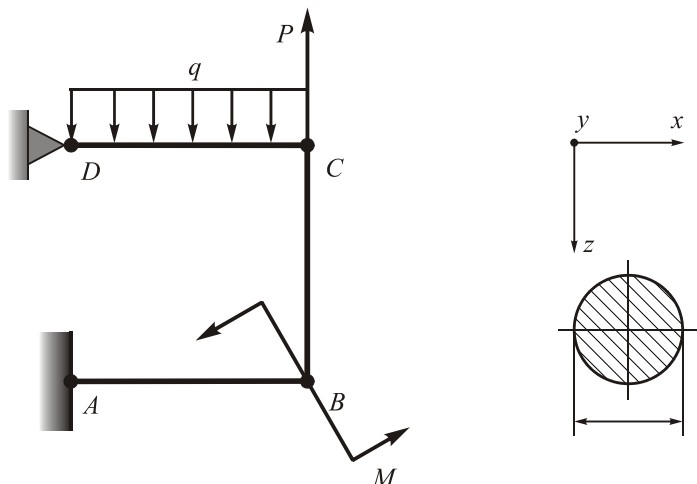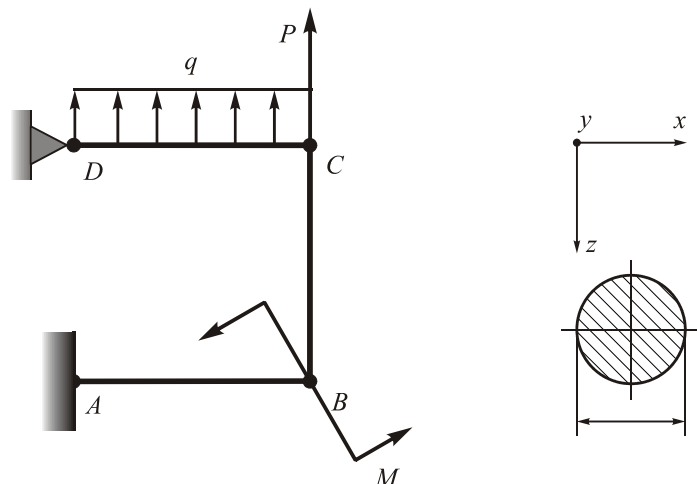**Variant: 87**                    **Complexity: 1**



**Given:** $q = 10 \,\text{kN/m}$; $P = 20 \,\text{kN}$; $M = 10 \,\text{kNm}$; $l = 2 \,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

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## National aerospace university
## "Kharkiv Aviation Institute"
## Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 88**                    **Complexity: 1**
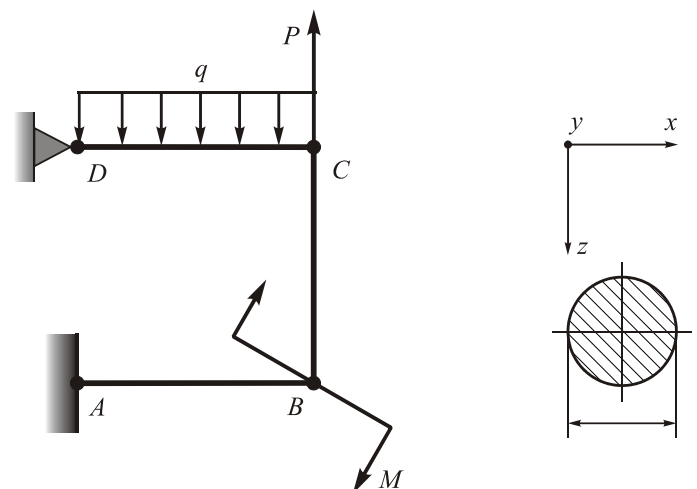


**Given:** $q = 10 \,\text{kN/m}$; $P = 20 \,\text{kN}$; $M = 10 \,\text{kNm}$; $l = 2 \,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

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**Mark:**

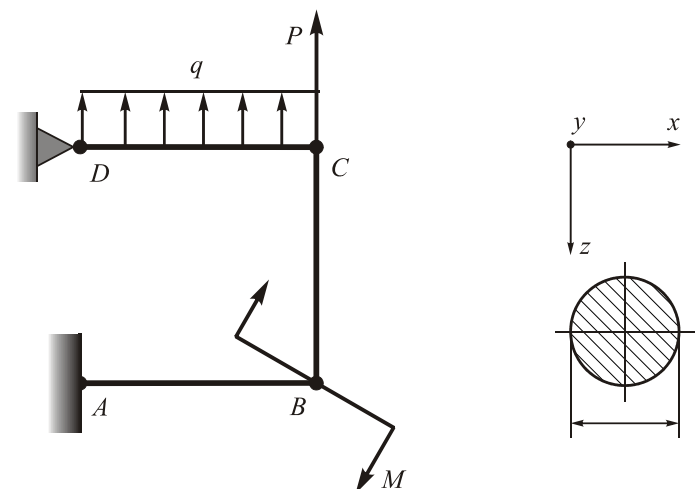**Variant: 89**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 90**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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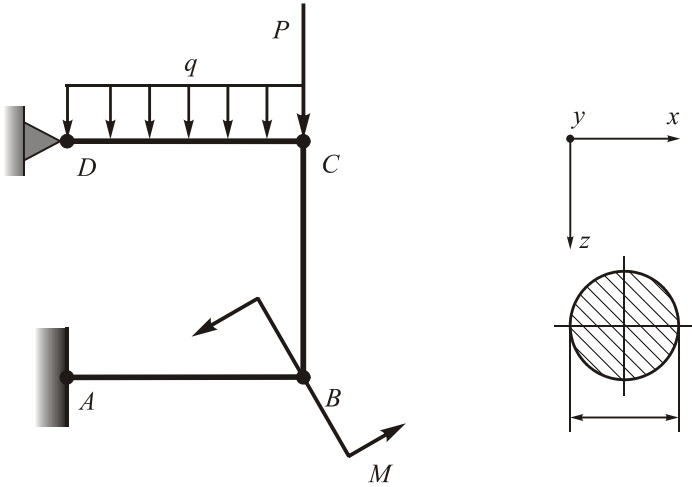**Variant: 91**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

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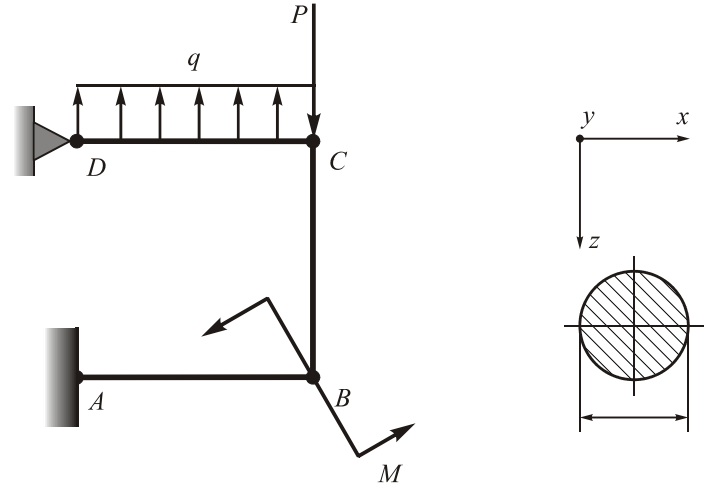**Variant: 92**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.

**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**                    **signature**

**Mark:**

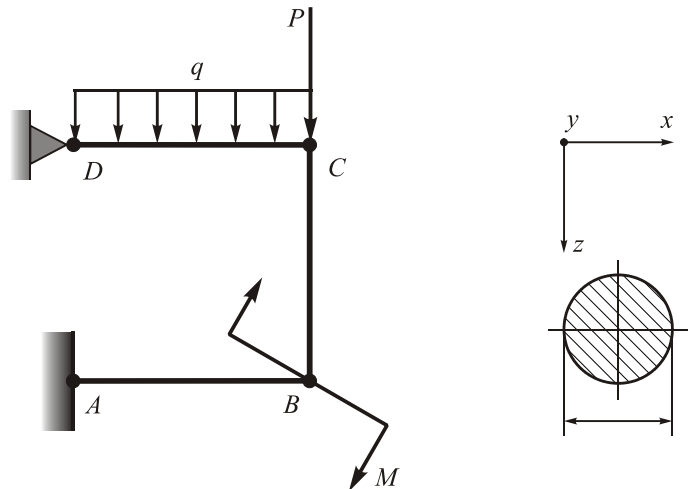**Variant: 93**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                                    **signature**

**Full name of the lecturer**

**Mark:**

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**Variant: 94**                    **Complexity: 1**



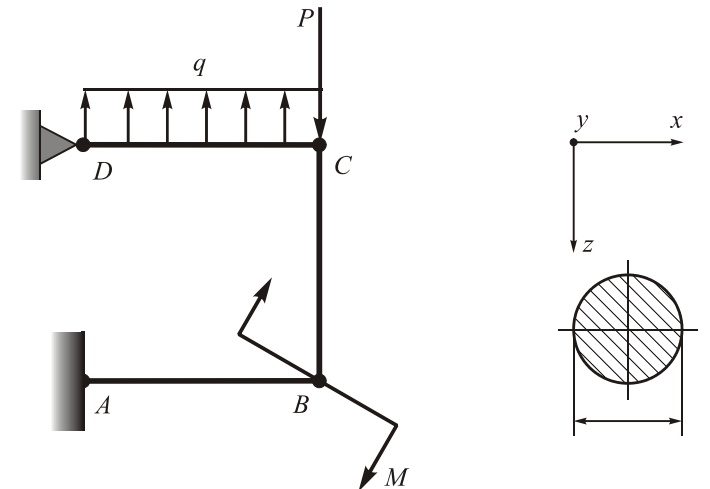**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                                    **signature**

**Full name of the lecturer**

**Mark:**

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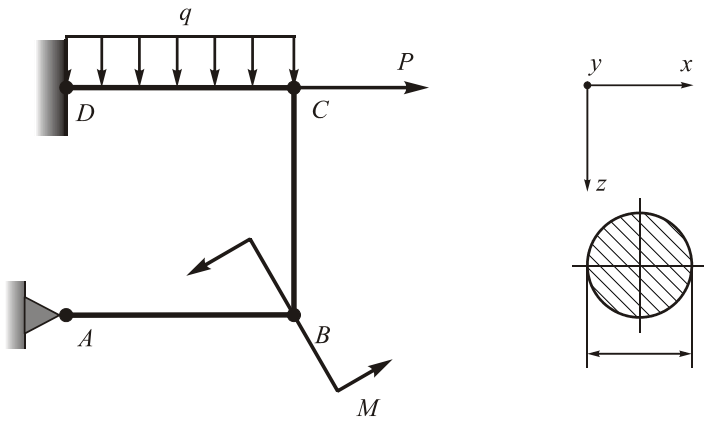**Variant: 95**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                                    **signature**

**Full name of the lecturer**

**Mark:**

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**Variant: 96**                    **Complexity: 1**



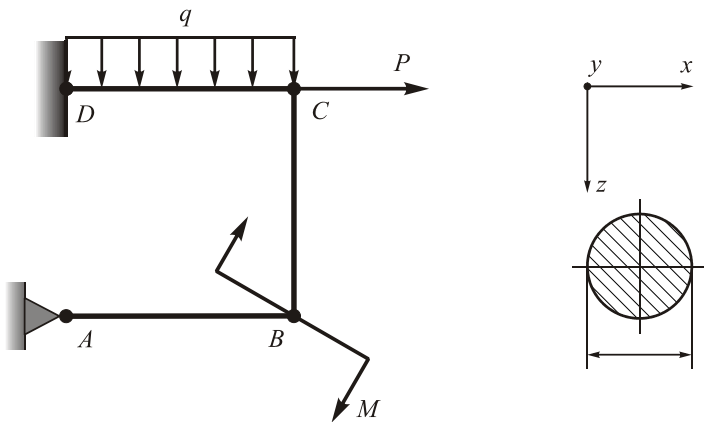**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

                                                    **signature**

**Full name of the lecturer**

**Mark:**

**Variant: 97**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x),\ Q_z(x),\ M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 98**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x),\ Q_z(x),\ M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 99**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x),\ Q_z(x),\ M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 100**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x),\ Q_z(x),\ M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**
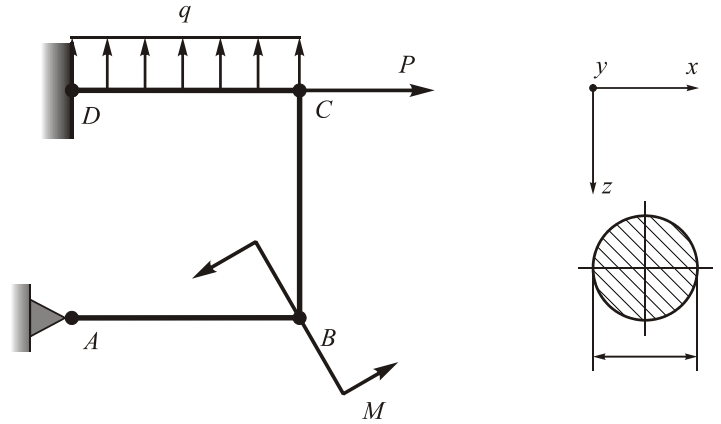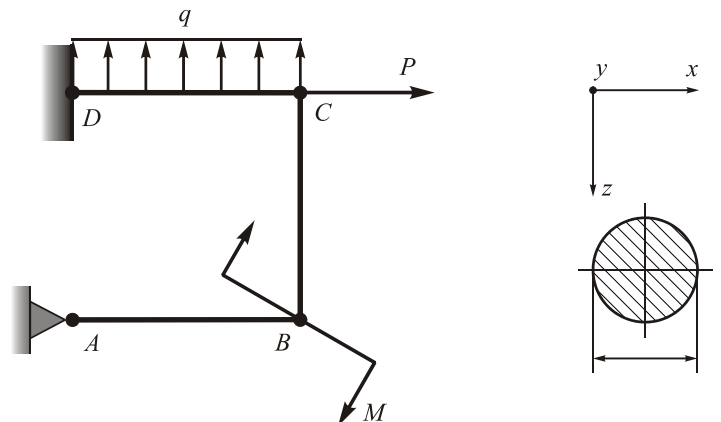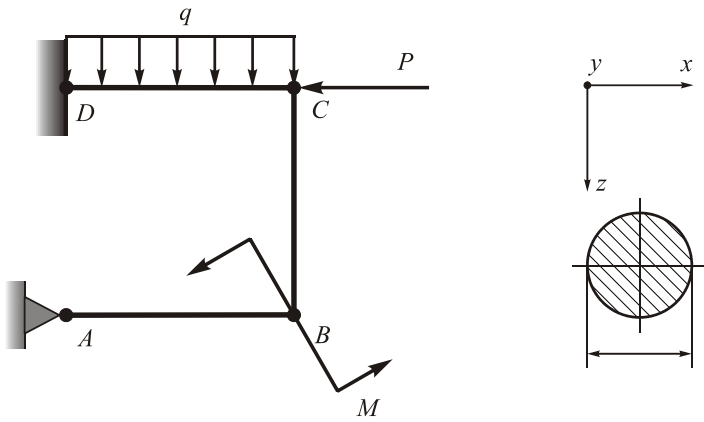
**Variant: 101**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
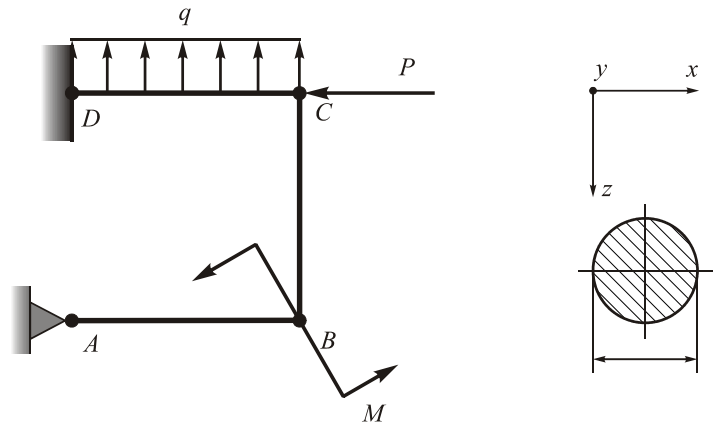
**Full name of the lecturer**

                                        **signature**

**Mark:**

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**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 102**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
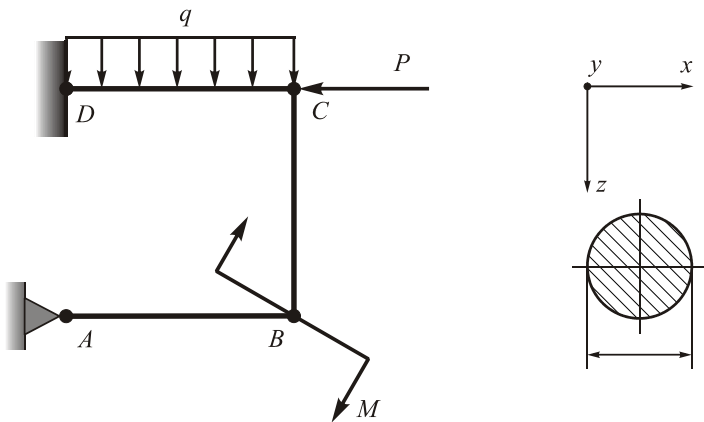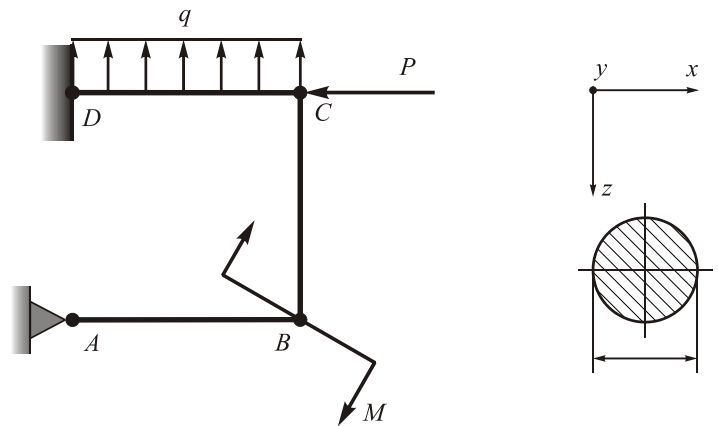
**Full name of the lecturer**

                                        **signature**

**Mark:**

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**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 103**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
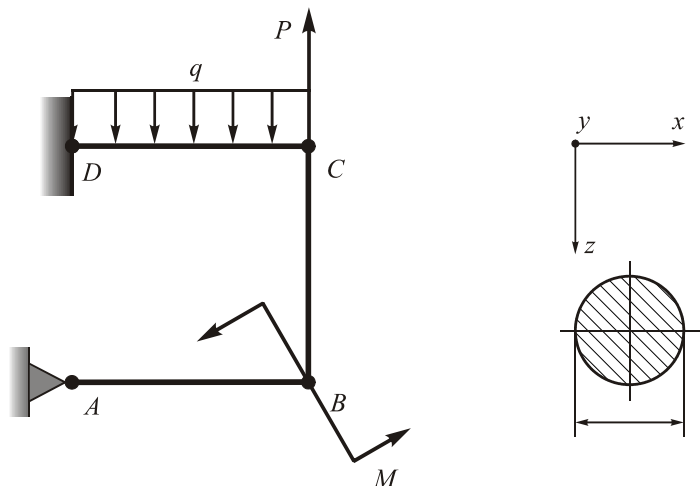**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**

                                        **signature**

**Mark:**

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**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 104**                    **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
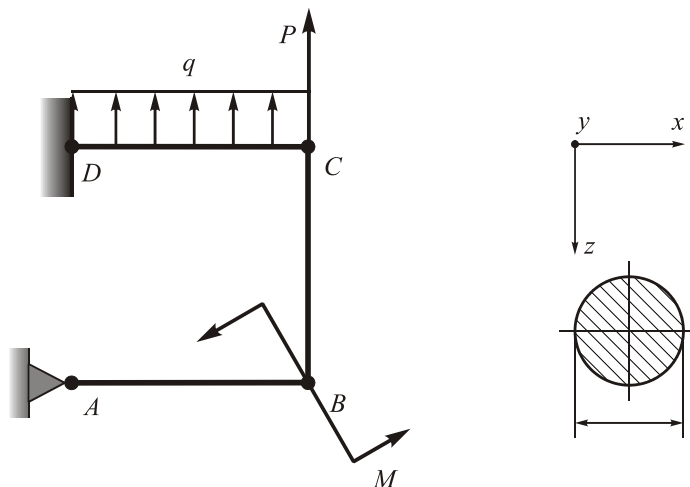
**Full name of the lecturer**

                                        **signature**

**Mark:**

**Variant: 105**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

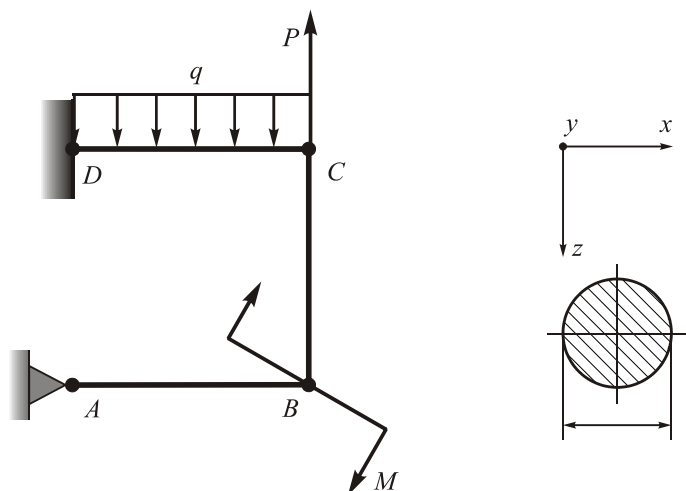**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 106**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
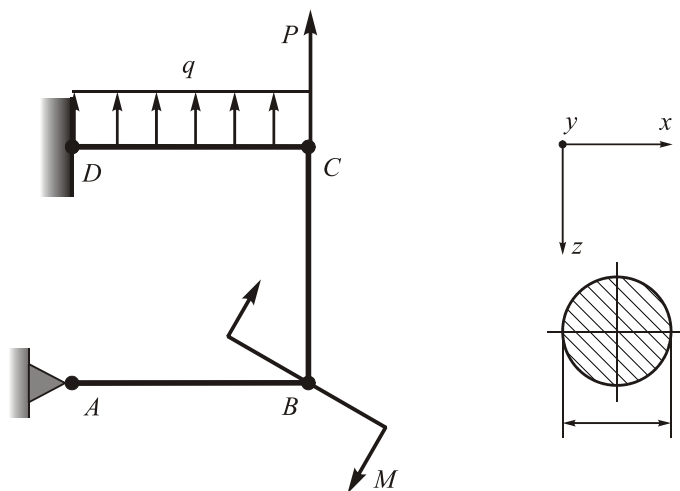**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 107**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 108**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
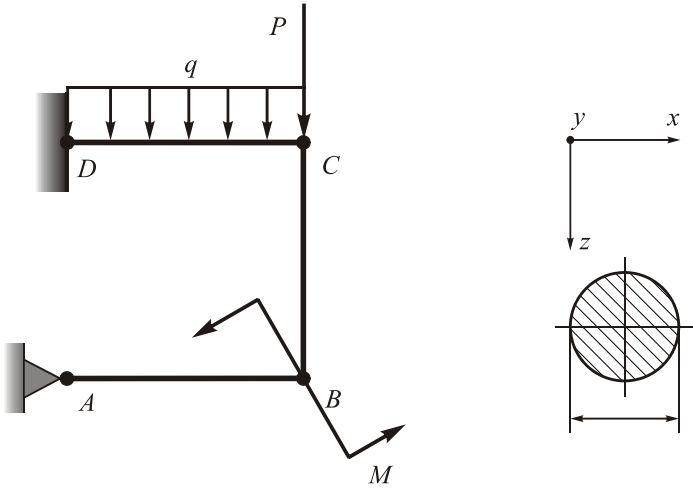
**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 109**        **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
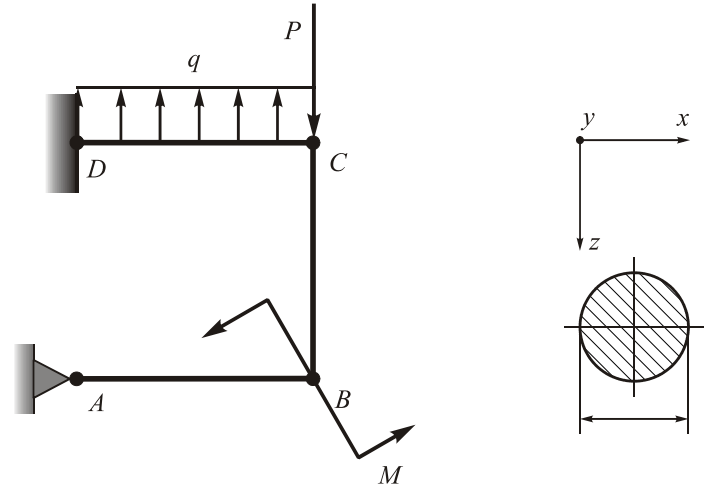
**Full name of the lecturer**      **signature**

**Mark:**

**Variant: 110**        **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
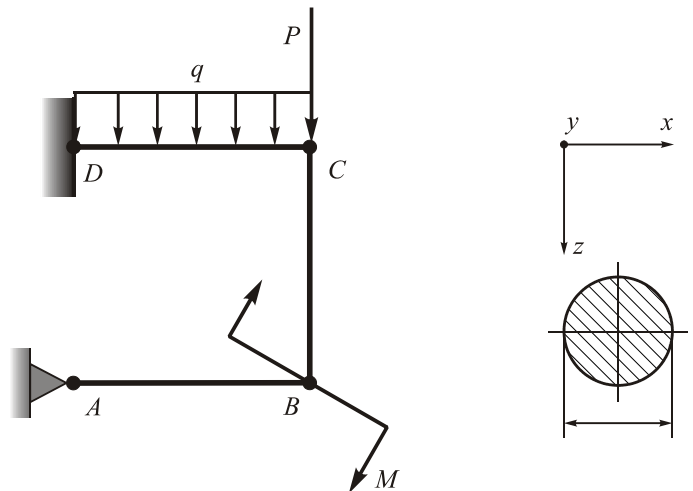
**Full name of the lecturer**      **signature**

**Mark:**

**Variant: 111**        **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
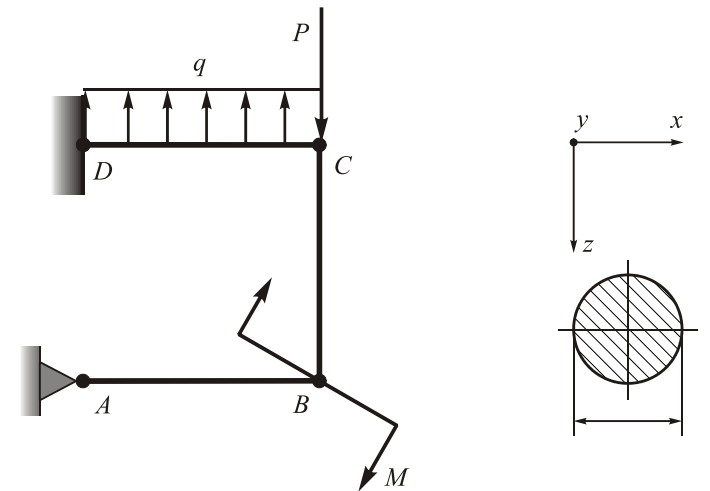
**Full name of the lecturer**      **signature**

**Mark:**

**Variant: 112**        **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**      **signature**

**Mark:**

**Variant: 113**          **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
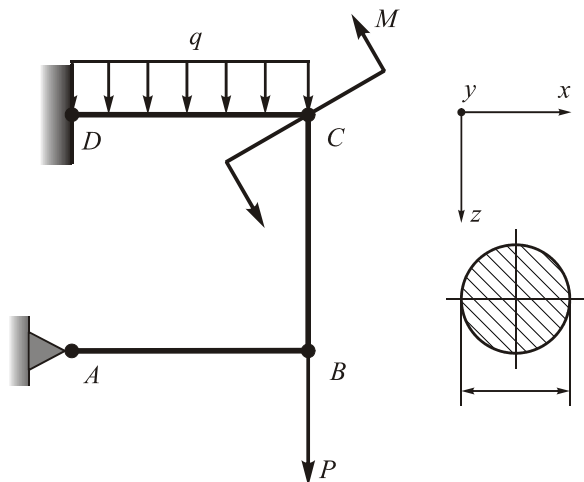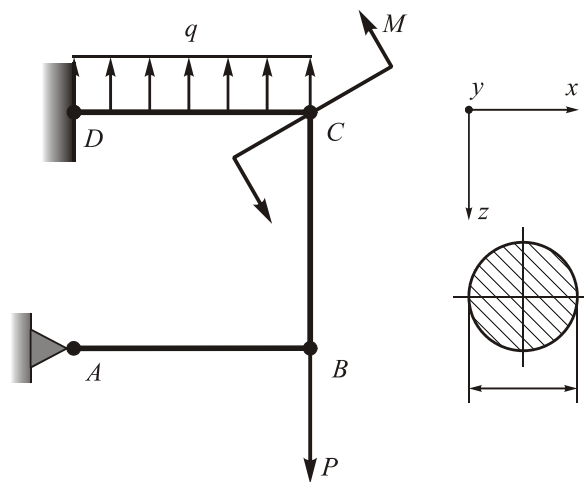
signature

**Full name of the lecturer**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**
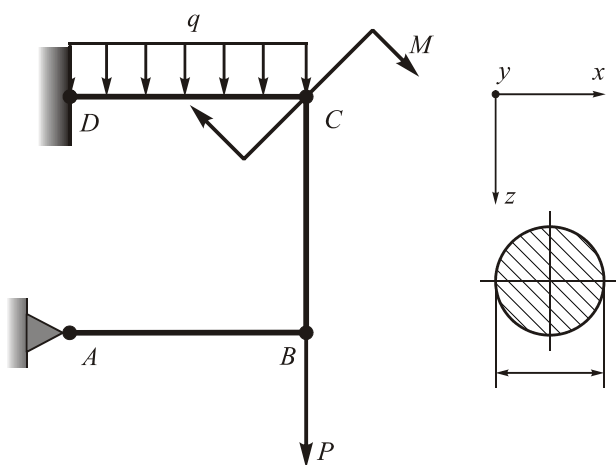
**Variant: 114**          **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**
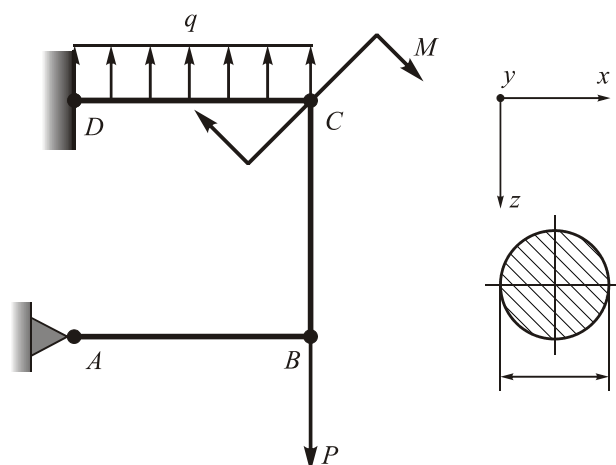
**Variant: 115**          **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

---

**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**
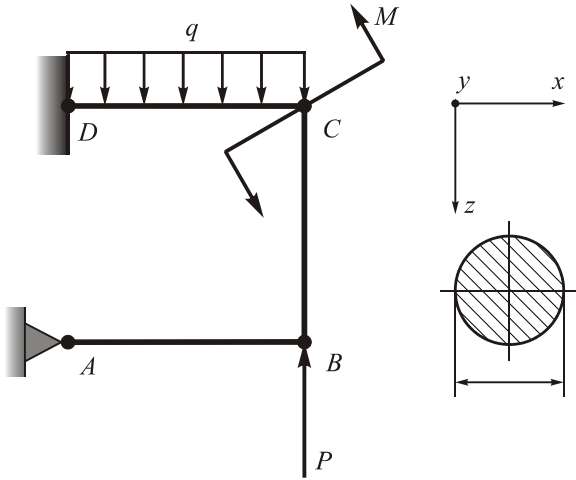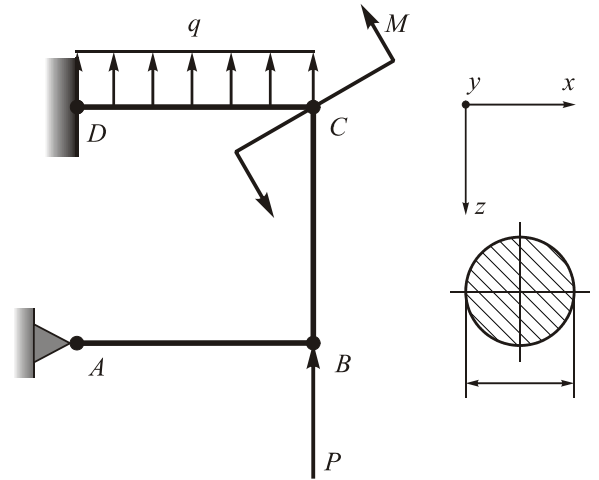
**Variant: 116**          **Complexity: 1**

**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

**Variant: 117**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**
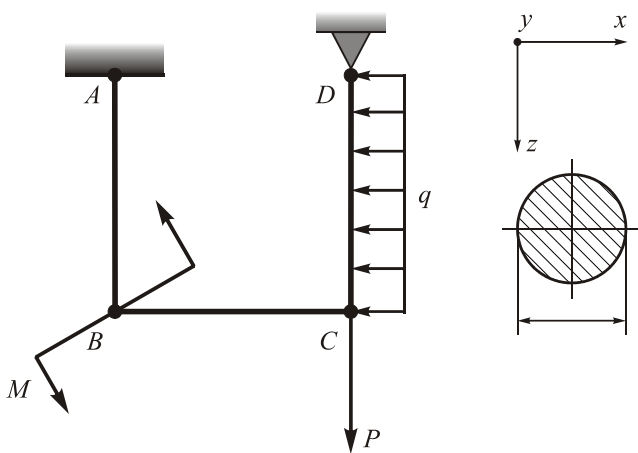
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**Variant: 118**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**
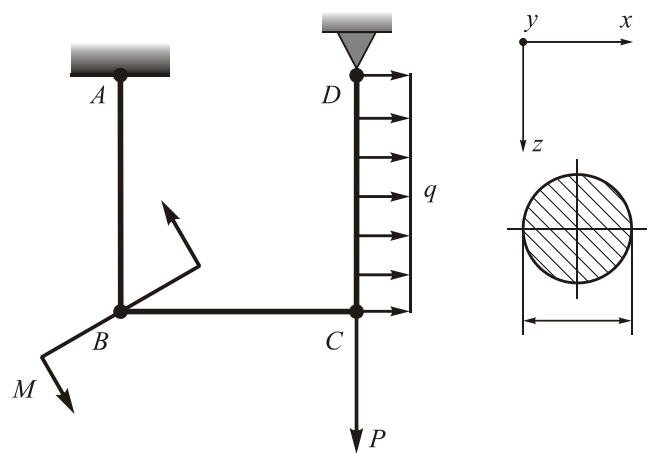
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**Variant: 119**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 120**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
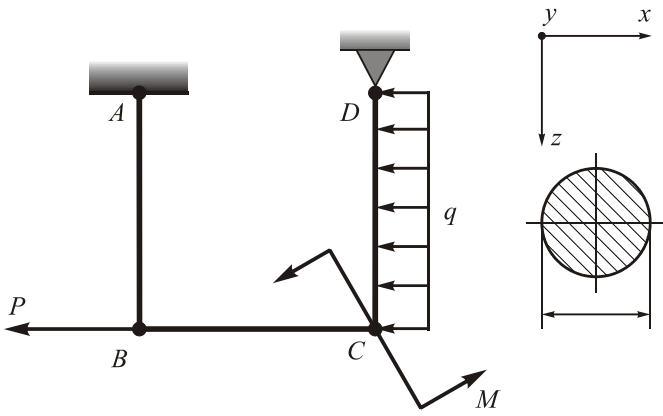**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
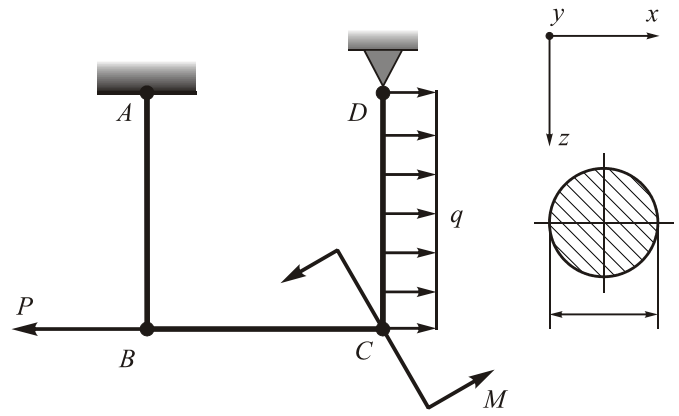
**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 121**                    **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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**Variant: 122**                    **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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**Variant: 123**                    **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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**Variant: 124**                    **Complexity: 1**



**Given:** $q = 10$ kN/m; $P = 20$ kN; $M = 10$ kNm; $l = 2$ m.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

**Variant: 125**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
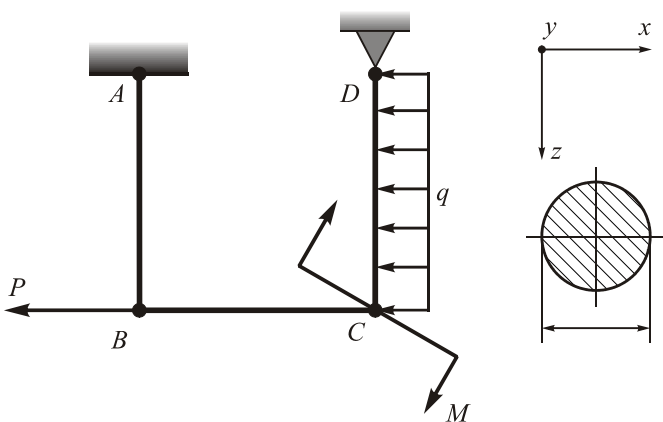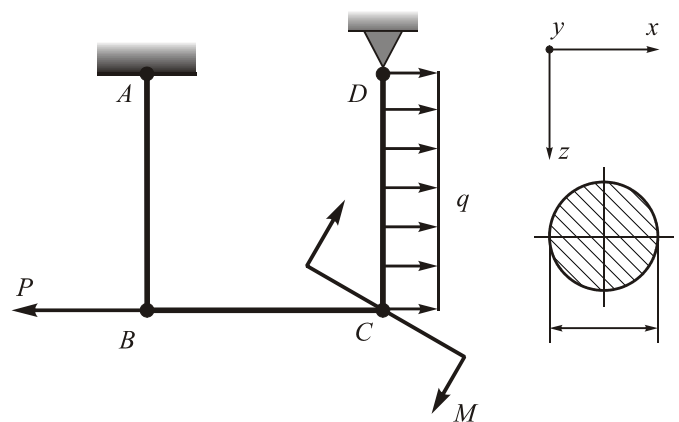
**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 126**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
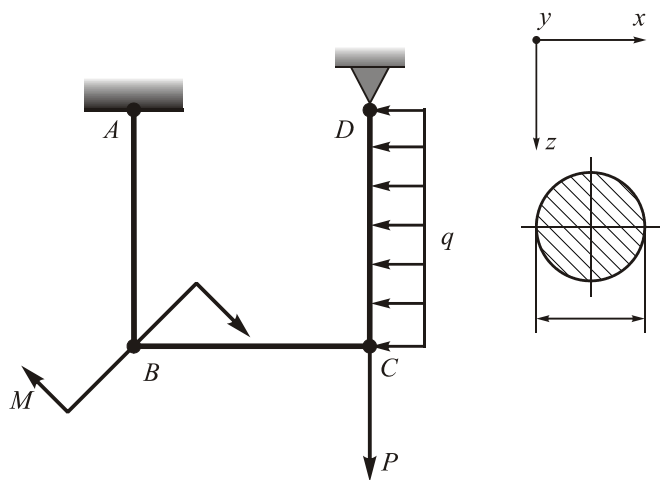
**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 127**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
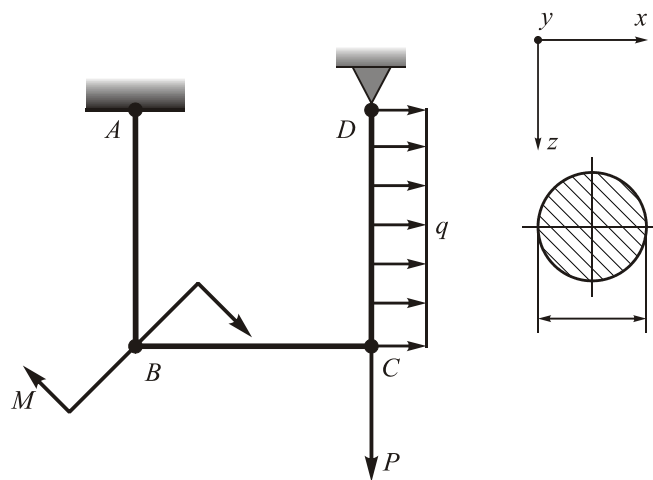
**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 128**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
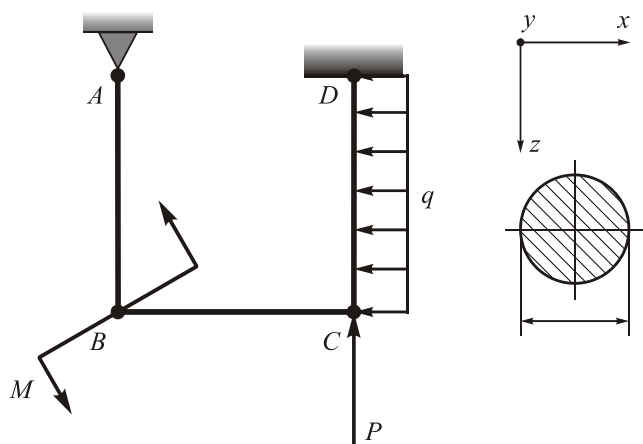
**Full name of the lecturer**                    **signature**

**Mark:**

**Variant: 129**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
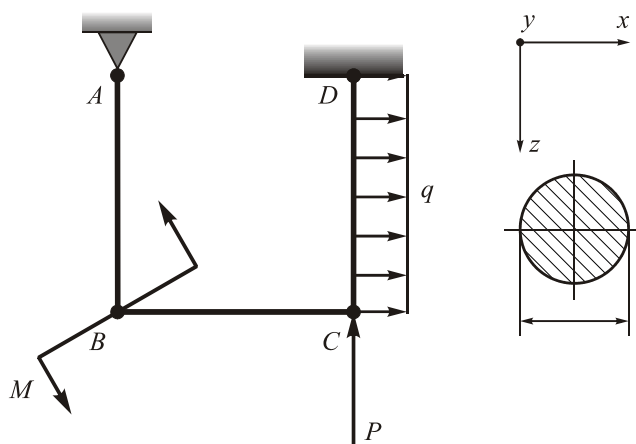$N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 130**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x).$

**signature**

**Full name of the lecturer**

**Mark:**

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**Variant: 131**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x).$

**signature**

**Full name of the lecturer**

**Mark:**

---

**Variant: 132**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x).$

**signature**

**Full name of the lecturer**

**Mark:**

**Variant: 133**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
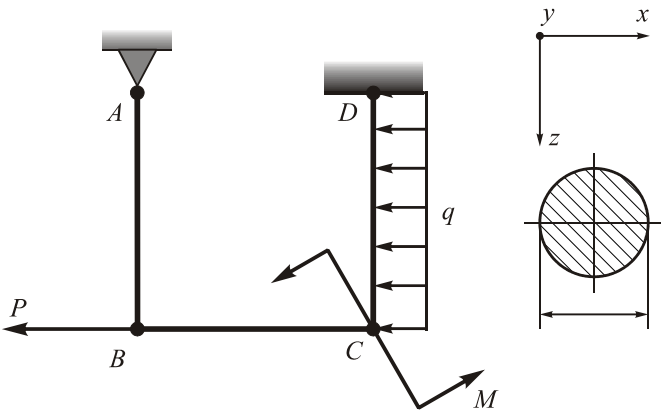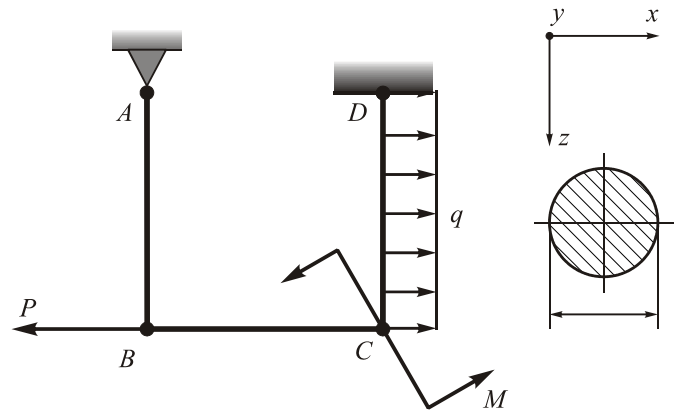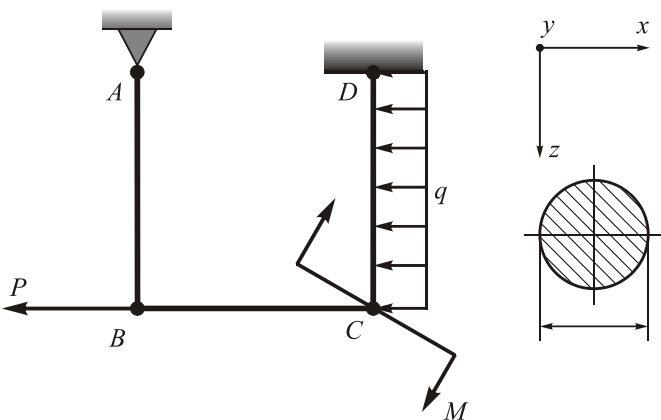
**Full name of the lecturer**         **signature**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 134**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
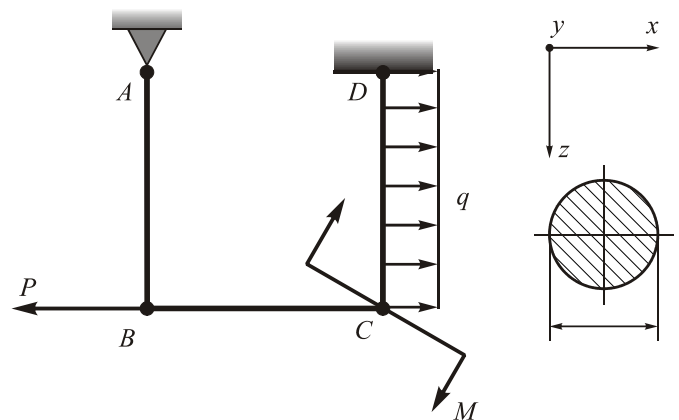
**Full name of the lecturer**         **signature**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 135**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
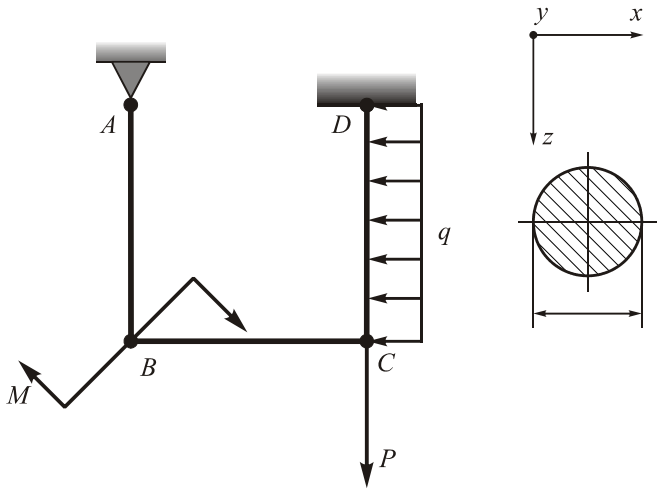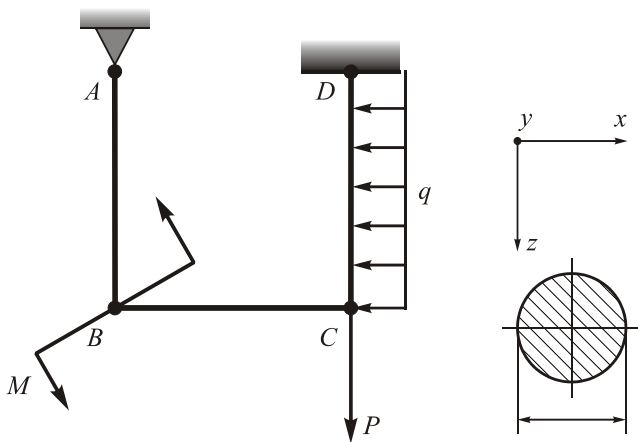
**Full name of the lecturer**         **signature**

**Mark:**

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**National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**
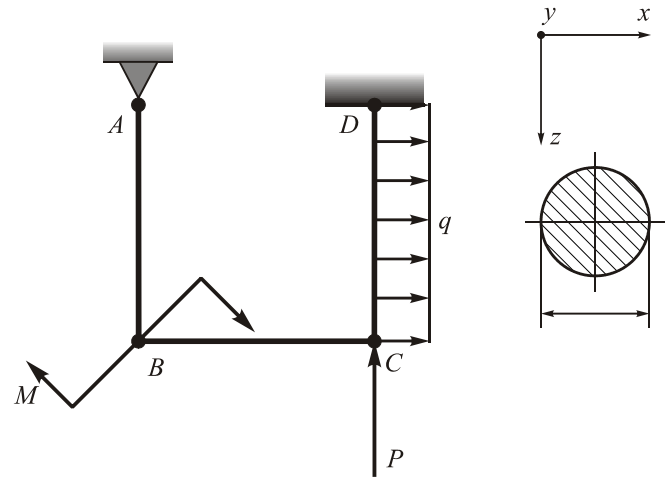
**Variant: 136**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

**Full name of the lecturer**         **signature**

**Mark:**

## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
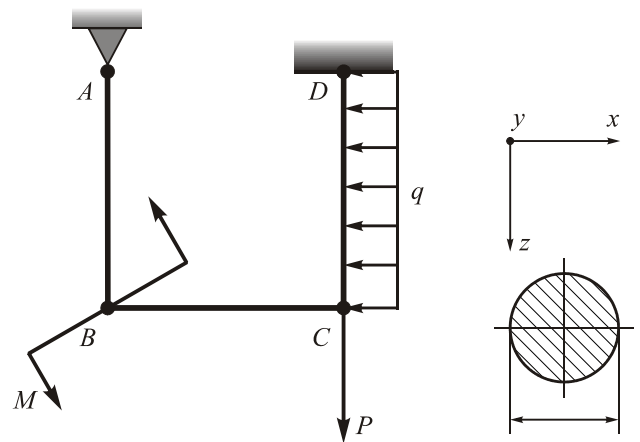**Full name of the student, group**

**Variant: 137**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                **signature**

**Mark:**

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## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 138**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
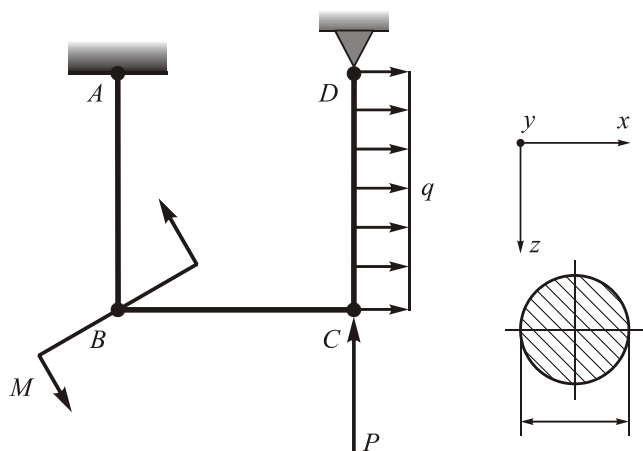**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
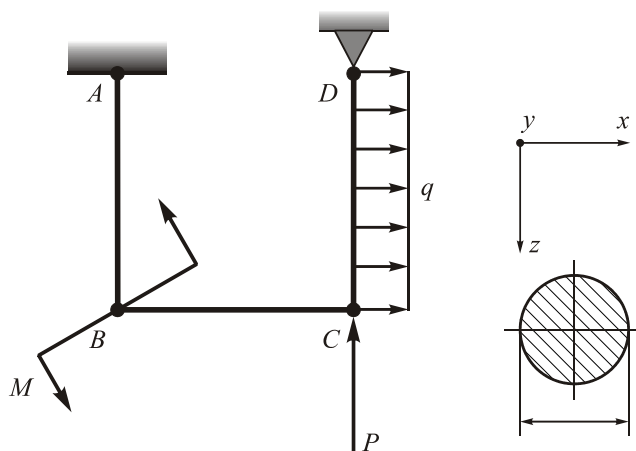
**Full name of the lecturer**                **signature**

**Mark:**

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## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 139**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
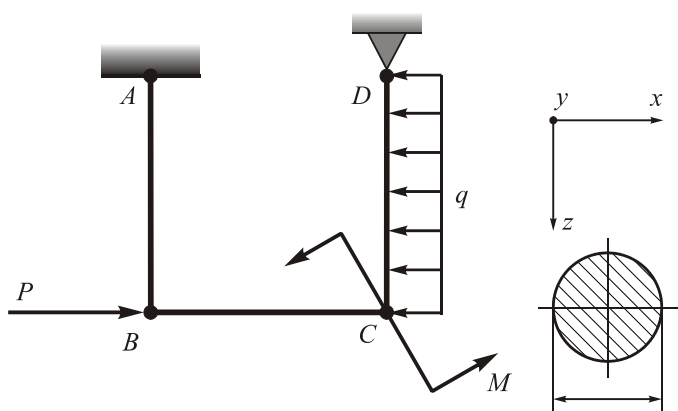
**Full name of the lecturer**                **signature**

**Mark:**

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## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 140**          **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x).$
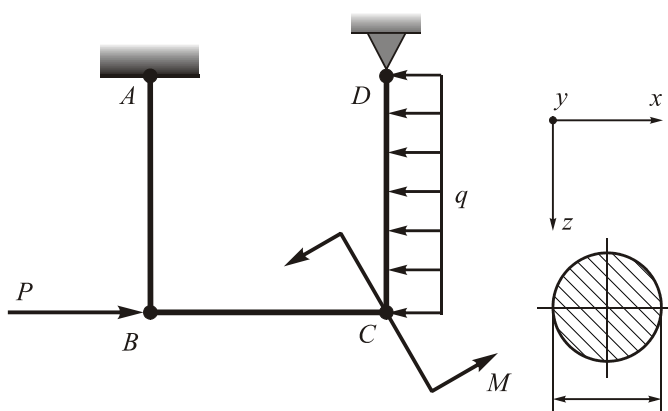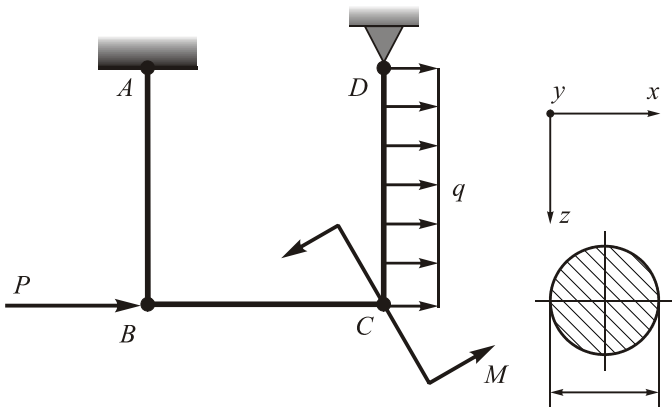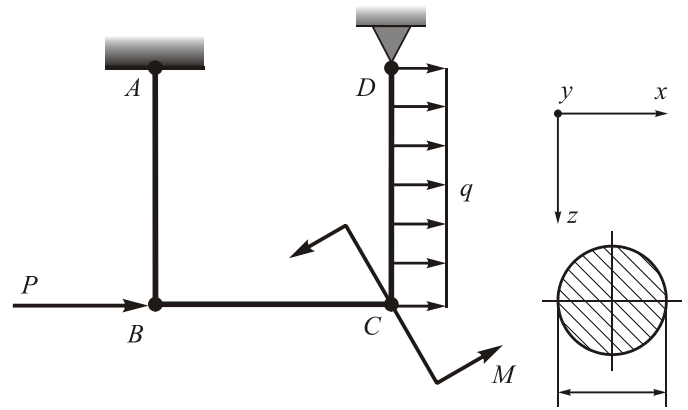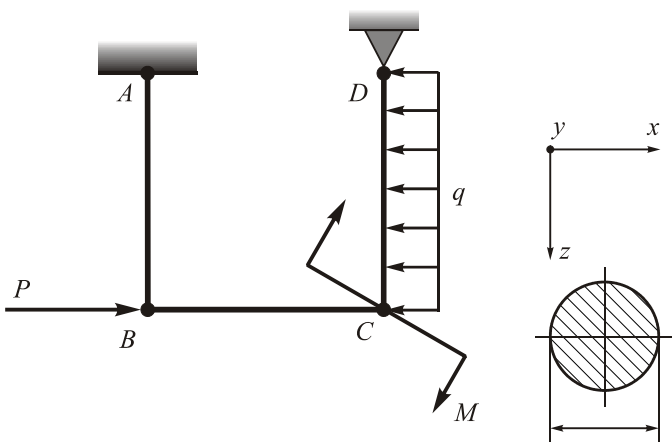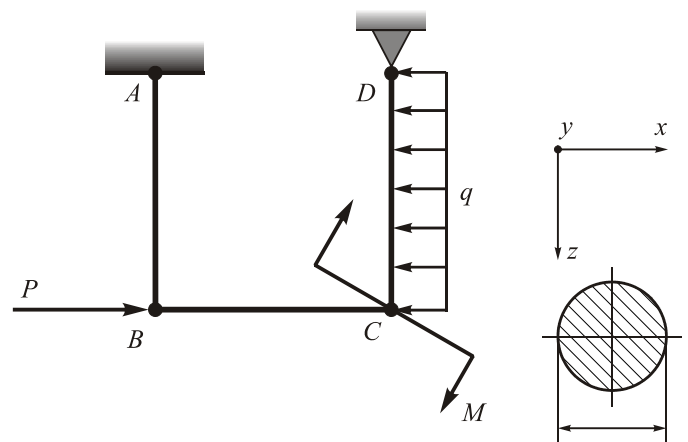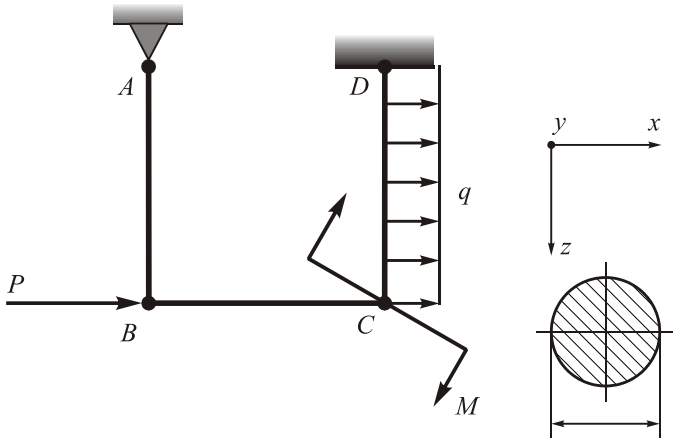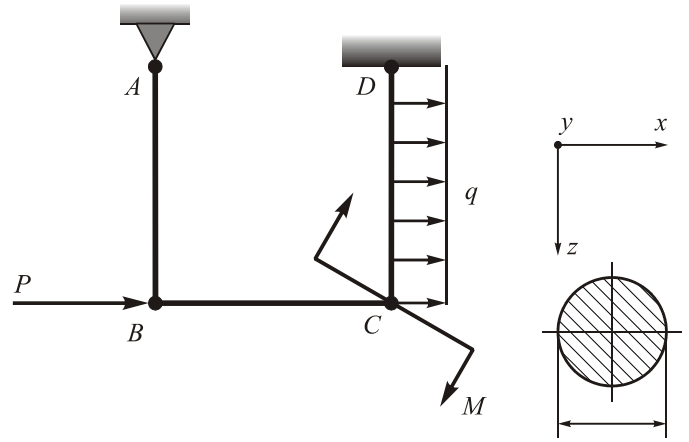
**Full name of the lecturer**                **signature**

**Mark:**

National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 141**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 142**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

---

National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 143**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

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National aerospace university
"Kharkiv Aviation Institute"
Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

**Variant: 144**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.

signature

**Full name of the lecturer**

**Mark:**

## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

---

**Variant: 145**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
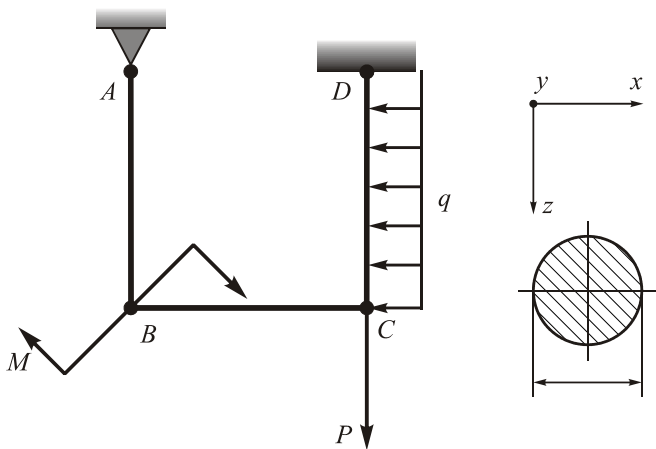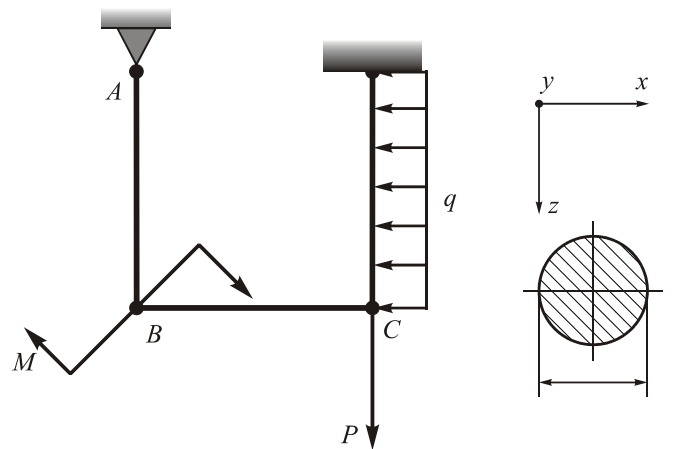
**Full name of the lecturer**                 **signature**

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**Mark:**

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## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

---

**Variant: 146**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
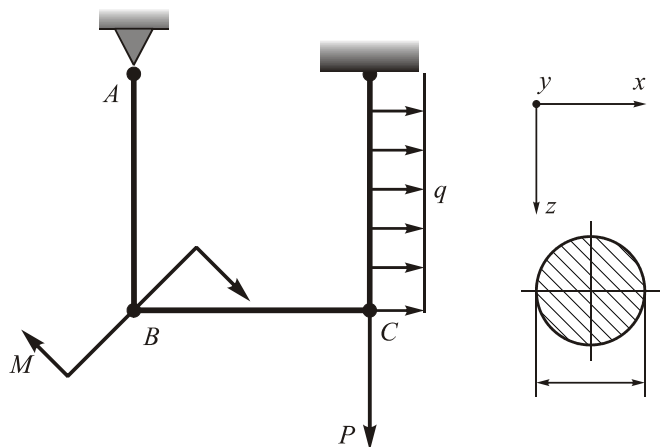
**Full name of the lecturer**                 **signature**

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**Mark:**

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## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 147**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
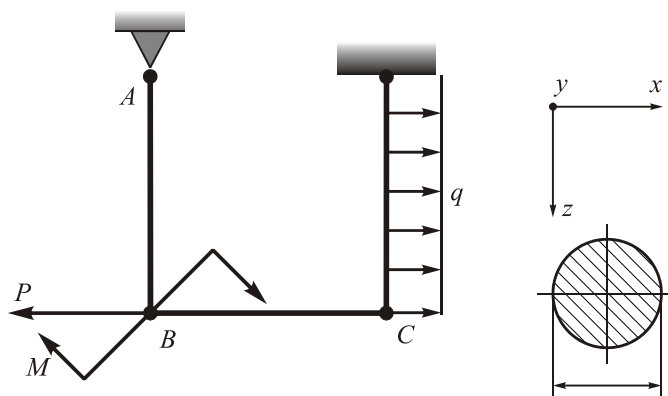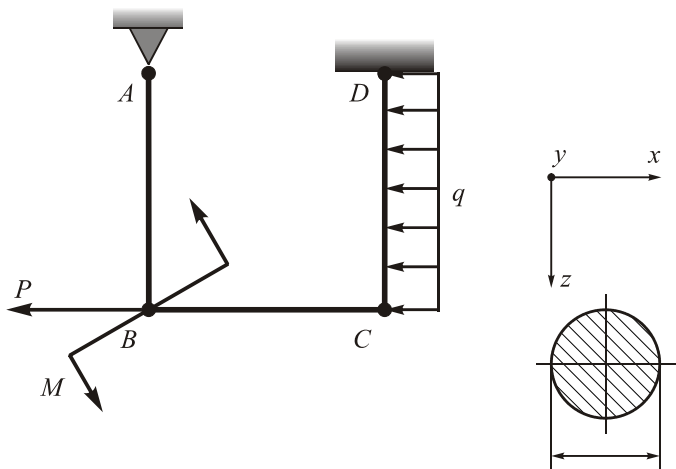
**Full name of the lecturer**                 **signature**

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**Mark:**

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## National aerospace university "Kharkiv Aviation Institute" Department of aircraft strength

**Subject:** mechanics of materials
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**Variant: 148**                 **Complexity: 1**



**Given:** $q = 10\,\text{kN/m}$; $P = 20\,\text{kN}$; $M = 10\,\text{kNm}$; $l = 2\,\text{m}$.
**Goal:** 1) open static indeterminacy using the force method and draw the graphs $N_x(x), Q_z(x), M_y(x)$.
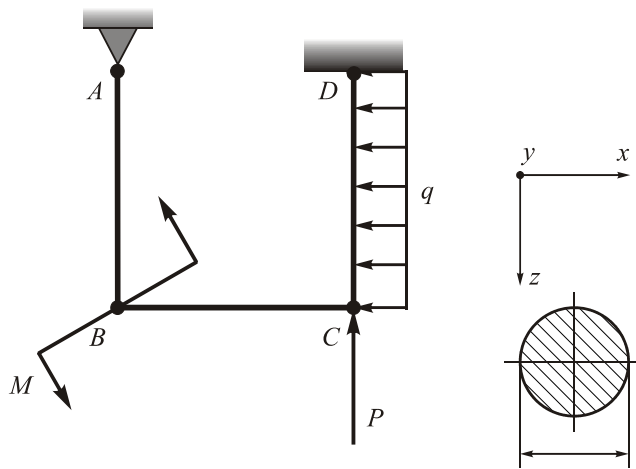
**Full name of the lecturer**                 **signature**

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**Mark:**

**National aerospace university**
**"Kharkiv Aviation Institute"**
**Department of aircraft strength**

**Subject:** mechanics of materials
**Document:** home problem
**Topic:** Internal Forces in Statically Indeterminate Plane Frames.
**Full name of the student, group**

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**Variant: 149**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
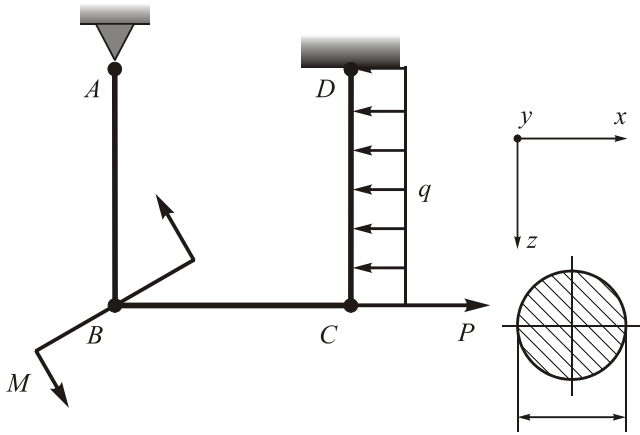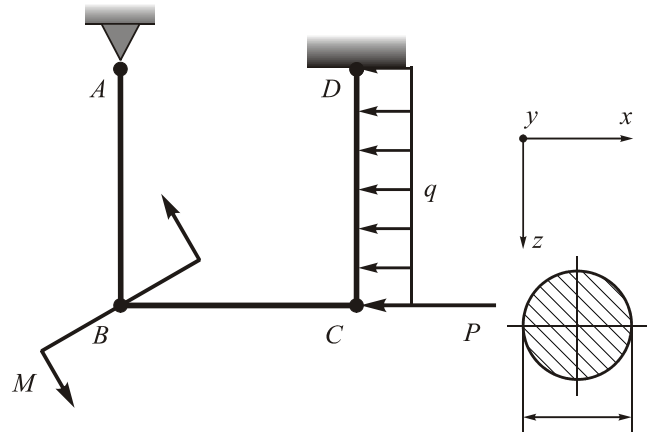$N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**

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**Variant: 150**                    **Complexity: 1**



**Given:** $q = 10\,\text{kN/m};\ P = 20\,\text{kN};\ M = 10\,\text{kNm};\ l = 2\,\text{m}.$
**Goal:** 1) open static indeterminacy using the force method and draw the graphs
$N_x(x), Q_z(x), M_y(x).$

**Full name of the lecturer**                    **signature**

**Mark:**