



**RENCANA PEMBELAJARAN SEMESTER (RPS)**  
**PROGRAM STUDI S1 PENDIDIKAN TEKNIK BANGUNAN**  
**JURUSAN TEKNIK SIPIL, FAKULTAS TEKNIK, UNIVERSITAS NEGERI PADANG**

| COURSES                           | CODE   | GROUP OF COURSES  | SCU   |   | SEM | VERSI<br>ON |
|-----------------------------------|--|---|---|---|-----|-------------|
|                                   |  |   | Theory  | Pract   |     |             |
| Statika                           | SIP1.61.1102   | Study Program Compulsory Courses                        | 3   | 0   | 1   | 1           |
| Responsible Lecturer              | Drs. Juniman Silalahi, M.Pd.   |   |   | the signature of the responsible lecturer<br><br>Drs. Juniman Silalahi, M.Pd. |     |             |
| <u>Information</u>                | <b>Dean of the Faculty of Engineering</b>  | <b>Head of the Civil Engineering Department</b>         | <b>Study Program Coordinator Building Engineering Education</b> |   |     |             |
|                                   | <u>Dr. Fahmi Rizal, M.Pd., M.T</u><br>NIP. 195912041985031004  | <u>Faisal Ashar, Ph.D.</u><br>NIP. 19750103 200312 1001 | Drs. Revian Body, MSA.<br>NIP. 19600103 198503 1003             |   |     |             |
| <b>Graduate Learning Outcomes</b> | <b>Learning Achievement of Graduate Study Programs</b>   |   |   |   |     |             |
|                                   | <ol style="list-style-type: none"> <li>1. Able to apply basic science knowledge (mathematics, natural sciences) and other multidisciplinary disciplines which become the foundation for the field of Building Engineering Vocational Education in carrying out professional work in their respective fields (knowledge and understanding).               <ol style="list-style-type: none"> <li>1.1. Able to show good understanding and implement basic mathematical concepts to solve various problems in the field of building engineering.</li> <li>1.2. Have a high understanding and can implement basic concepts of physics and chemistry (natural sciences) in the field of building engineering.</li> <li>1.3. Have a high understanding and can implement the basic principles of basic engineering (mechanics, engineering drawings, materials science) in the field of building engineering.</li> </ol> </li> <li>2. Able to think critically and creatively in identifying, formulating, problem-solving, evaluating various problems in the</li> </ol> |   |   |   |     |             |

field of Building Engineering Vocational Education with the most appropriate and effective scientific method (engineering analysis, investigations and assessment).

- 2.1. Able to identify various technical problems in the field of building engineering
- 2.2. Able to analyze various technical problems in the field of building engineering
- 2.3. Able to evaluate various technical problems in the building sector
- 2.4. Able to communicate Engineering Analysis, Investigation and Assessment materials to students/training
3. Have a reliable ability in designing, implementing and supervising engineering design works.
  - 3.1. Able to realize work drawings in collaboration with various related parties.
  - 3.2. Able to manage building engineering work by paying attention to environmental, social, health and safety aspects.
  - 3.3. Able to supervise the implementation of building engineering work
  - 3.4. Able to communicate Engineering Design material to students.
4. Have reliable abilities in designing, implementing and evaluating the learning process in Building Engineering Vocational Education (Education design).
  - 4.1. Able to design curriculum and learning process in building engineering.
  - 4.2. Able to implement, control, evaluate and improve the quality of the learning process
  - 4.3. Able to develop effective, efficient, and attractive learning media.
5. Having the ability to adapt and innovate to the development of science and technology and implement it into educational goals and professional work by considering possible non-technical risks (Engineering practice).
  - 5.1. Able to innovate and develop technology in the field of building engineering by considering social, economic and environmental aspects.
  - 5.2. Able to analyze environmental conditions in the planning, implementation and supervision of buildings.
  - 5.3. Implement information technology and computers into the planning, implementation, and supervision processes of buildings.
6. Have social and managerial competence, work together, communicate effectively, have entrepreneurial character, are environmentally friendly and aware of the importance of lifelong learning (transferable and soft skills).
  - 6.1. Able to work creatively, innovatively, collaboratively, be careful, responsible, responsive to environmental changes.
  - 6.2. Have curiosity, think critically, are open-minded adjective.
  - 6.3. Able to communicate effectively and work together in teamwork.

**Course Learning**

**Learning Achievement of Course (CPMK)**

|                                     |   |  |                              |
|-------------------------------------|---|--|------------------------------|
| <b>Outcomes</b>                     | <b>CPMK</b>   |  | <b>CPL</b>                   |
|                                     | 1. Have basic knowledge of Statics  |  | 1.1, 1.2, 1.3                |
|                                     | 2. Understand the basic concepts of specific static structures  |  | 1.1, 1.2, 1.3                |
|                                     | 3. Able to calculate the forces in specific static structures   |  | 1.1, 1.2, 1.3, 6.1, 6.2, 6.3 |
|                                     | 4. Able to calculate stress on a beam cross-section   |  | 1.1, 1.2, 1.3, 6.1, 6.2, 6.3 |
|                                     | 5. Able to calculate rod forces   |  | 1.1, 1.2, 1.3, 6.1, 6.2, 6.3 |
| <b>Short descriptions of course</b> | This course provides basic knowledge of statics, basic concepts of specific static structures, calculating and painting forces in certain static structures, calculating stresses in beam sections, and calculating rod forces in frame structures. |  |                              |
| <b>References</b>                   | <b>Utama (RU) :</b>   |  |                              |
|                                     | 1. Juniman Silalahi, 2009, <i>Mekanika Struktur Jilid 1</i> , Penerbit UNP Press, Padang  |  |                              |
| <b>Learning Media</b>               | <b>Pendukung (RP)</b>   |  |                              |
|                                     | 1. Istimawan Dipohusodo, 2001, <i>Analisis Struktur Jilid 1</i> , Penerbit PT Gramedia Pustaka Utama, Jakarta   |  |                              |
|                                     | 2. Daniel L. Schodek, 1999, <i>Struktur</i> , Penerbit Erlangga, Jakarta.   |  |                              |
|                                     | 3. E.P. Popov, 1989, <i>Mekanika Teknik</i> , Penerbit Erlangga, Jakarta.   |  |                              |
|                                     | 4. J. Kwantes, 1985, <i>Mekanika Bangunan 1</i> , Penerbit Erlangga, Jakarta.   |  |                              |
|                                     | 5. Soemono, 1985, <i>Ilmu Gaya</i> , Penerbit Djambatan, Bandung.   |  |                              |
|                                     | 6. J.D. Todd, 1984, <i>Teori dan Analisis Struktur</i> , Penerbit Erlangga, Jakarta   |  |                              |
|                                     | 7. Heinz Frick, 1983, <i>Mekanika Teknik 1</i> , Penerbit Yayasan Kanisius, Jakarta.  |  |                              |
| <b>Learning Media</b>               | <b>Software:</b>  | <b>Hardware:</b>   |                              |
|                                     |   | Komputer, LCD Projector dan Papan tulis dan perangkatnya |                              |
| <b>Team Teaching</b>                |   |  |                              |
| <b>Assessment</b>                   | Mid Semester Assessment, Final Assessment, Personal & Group task, Group Presentation  |  |                              |
| <b>Requirements Subject</b>         | None  |  |                              |

## LEARNING MATERIALS

| Weeks   | Competence to be achieved  | Study Materials  | Learning Methods and Strategies                         | Assignments / task  | Assessment Criteria / Indicators  | Rreference                                     |
|---------|--|--|---|---|---|--|
| (1)     | Have basic knowledge about Statics.  | Basic knowledge of Statics, the system of units, styles and moments, and moments of style and moments of coupling                  | Lectures, discussion, questions & answers and exercises | Make a summary and description of the material presented.       | Be able to explain the meaning and principles of force and moment.  | RU-1, RP-2, RP-3, RP-4, RP-7                   |
| (2) (3) | Has the ability to calculate the resultant force analytically and graphically                  | Force resultant with allied catch points, graphically and analytically.  | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Homework  | Be able to determine the resultant force analytically and graphically correctly.  | RU-1, RP-1, RP-5, RP-7                         |
| (4)     | Have an understanding of a specific static structure.  | The basic concept of specific static structures, Load, Support, Support reaction, Shear force, Normal force, The moment of bending | Lectures, discussion, questions & answers and exercises | Make a summary and description of the material presented.       | Able to distinguish specific static structures with indefinite static. Able to explain the meaning of imposition, support, Support reaction, Shear force, Normal force, and The moment of bending | RU-1, RP-1, RP-2, RP-3, RP-4, RP-5, RP-6, RP-7 |
| (5)     | Have the ability to calculate and depict a diagram of the internal forces of a cantilever beam | Cantilever beam: Calculates bearing reaction, shear force, normal force and bending moment.  | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Be able to calculate and paint diagram of cantilever beam internal forces correctly.  | RU-1, RP-1, RP-2, RP-3, RP-4, RP-5, RP-6, RP-7 |
| (6) (7) | Has the ability to calculate and depict a simple block diagram of internal forces              | Simple beam with centred and even load: Calculate bearing reaction, shear force, normal force and bending moment                   | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Be able to calculate and paint diagram of simple block internal forces correctly.   | RU-1, RP-1, RP-2, RP-3, RP-4, RP-5, RP-6, RP-7 |

| Weeks        | Competence to be achieved  | Study Materials   | Learning Methods and Strategies                         | Assignments / task  | Assessment Criteria / Indicators  | Rreference                                     |
|--------------|--|---|---|---|---|--|
| (8)          | <b>Mid-Semester Evaluation through Mid-Semester Examination</b>  |   |   |   |   |  |
| (9)          | Have the ability to calculate and paint diagrams of angular beam internal forces                                     | Angle beam with combined load: Calculates bearing reaction, shear force, normal force and bending moment.   | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Be able to calculate and paint diagram of angular beam internal forces correctly.                     | RU-1, RP-1, RP-2, RP-3, RP-4, RP-5, RP-6, RP-7 |
| (10)<br>(11) | Has the ability to calculate and paint a simple portal, internal force diagrams                                      | Simple portal with combined load: Calculate bearing reaction, shear force, normal force and bending moment. | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Be able to calculate and paint simple portal, internal forces diagrams correctly                      | RU-1, RP-1, RP-2, RP-3, RP-4, RP-5, RP-6, RP-7 |
| (12)         | Have the ability to calculate and print a diagram of the internal forces of a Gerber continuous beam.                | Gerber continuous beam: Calculate the bearing reaction, shear force, normal force, and bending moment.      | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Be able to calculate and print a diagram of the internal forces of a Gerber continuous beam correctly | RU-1, RP-1, RP-2, RP-3, RP-4, RP-5, RP-6, RP-7 |
| (13)         | Has the ability to calculate the centre of gravity of regular objects and the moment of inertia of the cross-section | The point of gravity of regular objects;<br>Moment of Inertia   | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Mampu menghitung titik berat benda beraturan serta momen inersia penampang dengan benar               | RU-1, RP-3, RP-4, RP-7                         |
| (14)         | Has the ability to calculate the stress of a section due to regular, shear and bending forces                        | tension:<br>Normal, shear and bending   | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions<br>- Home work | Mampu menghitung tegangan suatu penampang akibat gaya normal, geser, dan lentur dengan benar          | RU-1, RP-3, RP-4, RP-7                         |
| (15)         | Have the ability to calculate the rod forces on the truss.   | Trunk frame:<br>Method Balance styles, Cremona, and Ritter cut  | Lectures, discussion, questions & answers and exercises | - Group discussion working on practice questions                | Be able to calculate the rod forces of a frame (Truss)  | RU-1, RP-3, RP-4, RP-7                         |

| Weeks | Competence to be achieved   | Study Materials | Learning Methods and Strategies | Assignments / task | Assessment Criteria / Indicators | Rreference |
|-------|---|-----------------|---------------------------------|--------------------|----------------------------------|------------|
|       |   |                 |                                 | - Home work        | correctly.                       |            |
| (16)  | <b>Final Semester Evaluation (Evaluation which is intended to determine the final achievement of student learning outcomes)</b> |                 |                                 |                    |                                  |            |

**Catatan :**

**Keterkaitan CPMK dengan CPL dan Metode Assesment**

| SIP1.61.1102 | Assesment | Bobot (%) | CPL-1 |   |   | CPL-2 |   |   |   | CPL-3 |   |   |   | CPL-4 |   |   | CPL-5 |   |   | CPL-6 |   |   |  |
|--------------|-----------|-----------|-------|---|---|-------|---|---|---|-------|---|---|---|-------|---|---|-------|---|---|-------|---|---|--|
|              |           |           | 1     | 2 | 3 | 1     | 2 | 3 | 4 | 1     | 2 | 3 | 4 | 1     | 2 | 3 | 1     | 2 | 3 | 1     | 2 | 3 |  |
| CPMK-1       | UTS.1     | 5         |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-2,3     | UTS.2     |           |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-4       | UTS.3     | 10        |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-5       | UTS.3     | 10        |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-6,7     | UTS.3     | 10        |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-9       | UAS.1     | 5         |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-10,11   | UAS.2     | 10        |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-12      | UAS.3     | 5         |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-13      | UAS.4     | 5         |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-14      | UAS.5     | 5         |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| CPMK-15      | UAS.6     | 5         |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
|              |           |           |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
|              |           |           |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
|              |           |           |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| Kehadiran    |           | 10        |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |
| TOTAL        |           | 100       |       |   |   |       |   |   |   |       |   |   |   |       |   |   |       |   |   |       |   |   |  |

**Komponen Penilaian**

Ujian Tengah Semester :35 %

|                      |         |
|----------------------|---------|
| Ujian Akhir Semester | : 35 %  |
| Tugas                | : 20 %  |
| <u>Kehadiran</u>     | : 10 %  |
| Total                | : 100 % |

### Deskripsi Tingkat Penilaian

|            | Excellent                                      | Good   | Satisfy  | Fail                        |
|------------|--|--|--|-----------------------------|
| Deskripsi  | Mampu mendeskripsikan dengan benar dan lengkap | Mampu mendeskripsikan dengan benar tapi kurang lengkap | Mampu mendeskripsikan tapi kurang jelas dan kurang lengkap | Tidak mampu mendeskripsikan |
| Formulasi  | Mampu memformulasikan dengan benar dan lengkap | Mampu memformulasikan dengan benar tapi kurang lengkap | Mampu memformulasikan tapi kurang jelas dan kurang lengkap | Tidak mampu memformulasikan |
| Menghitung | Mampu menghitung dengan benar dan lengkap      | Mampu menghitung dengan benar tapi kurang lengkap      | Mampu menghitung tapi kurang jelas dan kurang lengkap      | Tidak mampu menghitung      |
| Analisis   | Mampu menganalisis dengan benar dan lengkap    | Mampu menganalisis dengan benar tapi kurang lengkap    | Mampu menganalisis tapi kurang jelas dan kurang lengkap    | Tidak mampu menganalisis    |

### Sistem Penilaian

| Nilai Angka | Nilai Mutu | Angka Mutu | Sebutan Mutu       | Nilai Angka | Nilai Mutu | Angka Mutu | Sebutan Mutu |
|-------------|------------|------------|--------------------|-------------|------------|------------|--------------|
| 85 – 100    | A          | 4.0        | Dengan pujian      | 55 – 59     | C          | 2.0        | Cukup        |
| 80 – 84     | A-         | 3.6        | Sangat baik sekali | 50 – 54     | C-         | 1.6        | Kurang cukup |
| 75 – 79     | B+         | 3.3        | Baik sekali        | 40 – 49     | D          | 1.0        | Kurang       |
| 70 – 74     | B          | 3.0        | Baik               | ≤ 39        | E          | 0.0        | Gagal        |

|         |    |     |                  |   |   |   |          |
|---------|----|-----|------------------|---|---|---|----------|
| 65 – 69 | B- | 2.6 | Cukup Baik       | - | T | - | Tertunda |
| 60 – 64 | C+ | 2.3 | Lebih dari cukup |   |   |   |          |





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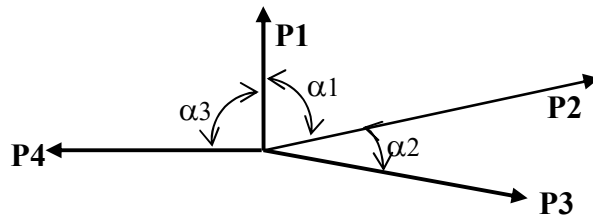
Alamat: Jl. Prof. Dr. Hamka, Kampus UNP Air Tawar, Padang 25131  
Telp. (0751) 7055644, Fax (0751) 7055628, website: [www.ft.unp.ac.id](http://www.ft.unp.ac.id), e-mail: [info@ft.unp.ac.id](mailto:info@ft.unp.ac.id)

**SOAL UJIAN TENGAH SEMESTER**

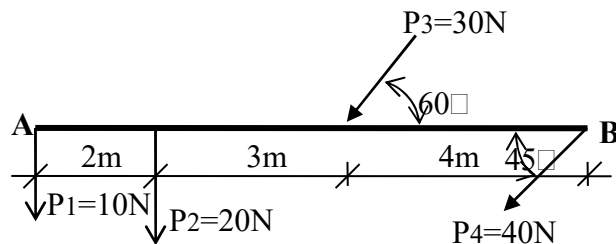
Matakuliah : Statika  
Kode / SKS : SIP1.61.1102  
Sifat Ujian : Buka Buku  
Dosen : Drs. Juniman Silalahi, M.Pd.  
Waktu : 120 menit  
Bobot nilai maksimal : 100

No Soal Bobot

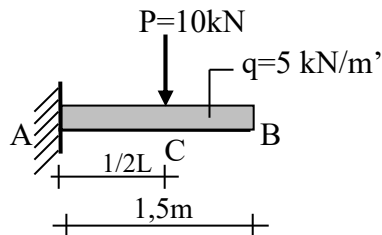
1. Diketahui empat gaya berasal dari satu titik tangkap bersekutu dengan arah dan besaran yang berbeda  $P_1=2$  kN,  $P_2=4$  kN,  $P_3=3$  kN dan  $P_4=5$  kN dengan  $\alpha_1=60^\circ$ ,  $\alpha_2=30^\circ$ , dan  $\alpha_3=90^\circ$ , seperti gambar. Hitung besar dan arah resultan gaya  $R$  secara grafis dan analitis. 15



2. Diketahui empat buah gaya  $P$  bekerja di sepanjang balok dengan bentuk, besaran, dan arah seperti pada gambar. Hitunglah besar resultan gaya  $R$ , dan tentukan letak titik tangkapnya secara grafis dan analitis. 15

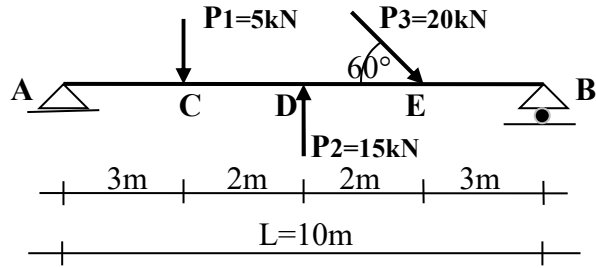


3. Suatu balok kantilever dengan bentuk, dimensi, dan pembebanan seperti pada gambar. Hitung reaksi tumpuan, gaya geser  $V_A$ ,  $V_C$ ,  $V_B$ , dan momen lentur  $M_A$ ,  $M_C$ ,  $M_B$ . Lukis bidang gaya geser, dan momen lentur. 10



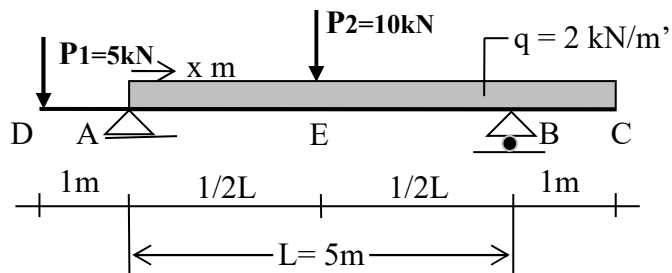
4. Suatu balok sederhana dengan bentuk, dimensi, dan pembebanan seperti pada gambar. Hitung reaksi tumpuan, gaya geser  $V_{A-C}$ ,  $V_{C-D}$ ,  $V_{D-E}$ ,  $V_{E-B}$ , gaya normal  $N_{A-E}$ , dan 30

momen lentur  $M_A$ ,  $M_C$ ,  $M_D$ ,  $M_E$ ,  $M_B$ . Lukis bidang gaya geser, bidang gaya normal, dan momen lentur.



5. Suatu balok sederhana dengan bentuk, dimensi, dan pembebanan seperti pada gambar. Hitung reaksi tumpuan, gaya geser  $V_{D-A}$ ,  $V_A$ ,  $V_D$ ,  $V_B$ ,  $V_C$ , dan momen lentur  $M_D$ ,  $M_A$ ,  $M_E$ ,  $M_B$ ,  $M_C$ . Lukis bidang gaya geser, dan momen lentur.

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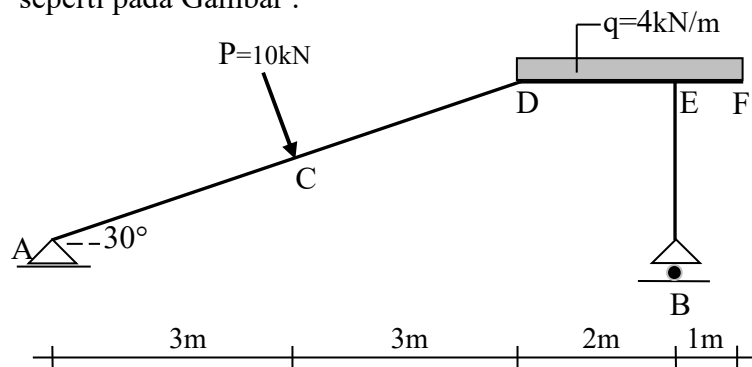
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Telp. (0751) 7055644, Fax (0751) 7055628, website: [www.ft.unp.ac.id](http://www.ft.unp.ac.id), e-mail: [info@ft.unp.ac.id](mailto:info@ft.unp.ac.id)

**SOAL UJIAN AKHIR SEMESTER**

Matakuliah : Statika  
Kode / SKS : SIP1.61.1102  
Sifat Ujian : Buka Buku  
Dosen : Drs. Juniman Silalahi, M.Pd.  
Waktu : 120 menit  
Bobot nilai maksimal : 100

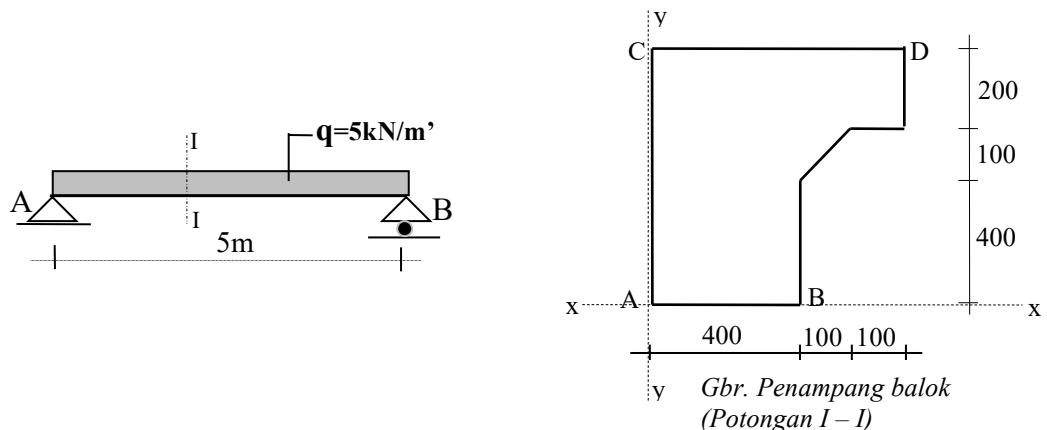
No Soal Bobot

1. Diketahui struktur portal statis tertentu dengan bentuk, dimensi, dan pembebanan seperti pada Gambar .



Ditanya:

- Hitung Reaksi tumpuan ( $R_{Ah}$ ,  $R_{Av}$ , dan  $R_B$ )
  - Hitung gaya geser ( $V_{A-C}$ ,  $V_{C-D}$ ,  $V_D$ ,  $V_{E(kiri)}$ ,  $V_{E(kanan)}$ ,  $V_F$ , dan  $V_{E-B}$ ) 50
  - Hitung momen lentur ( $M_A$ ,  $M_C$ ,  $M_D$ ,  $M_E$ ,  $M_F$ , dan  $M_B$ )
  - Lukis diagram gaya geser, dan momen lentur.
2. Diketahui balok sederhana dengan tumpuan sendi dan rol, menerima beban seperti pada Gambar.



Gbr. Penampang balok  
(Potongan I - I)

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Ditanya:

- a. Hitung momen lentur ( $M_{maks}$ ), dan gaya geser ( $V_{maks}$ )
- b. Tentukan letak titik berat penampang balok ( $Z_x$  dan  $Z_y$ )
- c. Hitung momen Inersia ( $I_z$ ,  $I_{AB}$ , dan  $I_{CD}$ )
- d. Hitung Tegangan lentur maksimum ( $\sigma_{maks}$ )
- e. Hitung tegangan geser pada garis netral penampang ( $\tau_{maks}$ )



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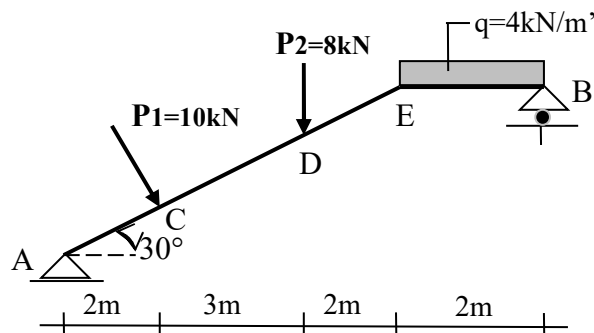
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Telp. (0751) 7055644, Fax (0751) 7055628, website: [www.ft.unp.ac.id](http://www.ft.unp.ac.id), e-mail: [info@ft.unp.ac.id](mailto:info@ft.unp.ac.id)

**SOAL TUGAS MATA KULIAH**

Matakuliah : Statika  
Kode / SKS : SIP1.61.1102  
Sifat Tugas : Diskusi dan Presentase Kelompok  
Dosen : Drs. Juniman Silalahi, M.Pd.  
Waktu presentasi : 60 menit  
Bobot nilai : 100

Kelompok Soal Nilai maks

1. Hitunglah gaya-gaya internal (reaksi tumpuan, gaya geser, gaya normal, dan momen lentur) dari balok bersudut dengan beban kombinasi seperti pada Gambar, serta gambarkan diagramnya. 50



2. Hitunglah gaya-gaya internal (reaksi tumpuan, gaya geser, gaya normal, dan momen lentur) portal sederhana seperti pada Gambar, serta gambarkan diagramnya. 50

