

SULIT



**UNIVERSITI TUN HUSSEIN ONN
MALAYSIA**

**PEPERIKSAAN AKHIR
SEMESTER I
SESI 2011/2012**

NAMA KURSUS : REKABENTUK STRUKTUR
KOD KURSUS : BPD 3082
PROGRAM : 3 BPC
TARIKH PEPERIKSAAN : JANUARI 2012
JANGKA MASA : 2 JAM 30 MINIT
ARAHAN : JAWAB SEMUA SOALAN

KERTAS SOALAN INI MENGANDUNGI **TUJUH (7)** MUKA SURAT

SULIT

- S1 Satu keratan rasuk segiempat bersaiz 300mm x 700mm dikehendaki menanggung momen rekabentuk sebesar 300kNm. Jika kekuatan muktamad konkrit, $f_{cu}=40 \text{ N/mm}^2$ dan kekuatan alahan tetulang, $f_y=460 \text{ N/mm}^2$, dengan menggunakan **Jadual S1** di dalam **Lampiran I**, hitungkan luas dan bilangan tetulang yang diperlukan. (20 markah)
- Q1 *A cross section beam with the size 300 mm x 700 mm is carrying design moment of 300kNm. If ultimate concrete strength, $f_{cu} =40 \text{ N/mm}^2$ and reinforcement yield strength $f_y= 460 \text{ N/mm}^2$ is used, by using **Table Q1** in **Appendix I**, calculate the area and amount of bar to be required.* (20 marks)
- S2 Hitung momen rintangan bagi ~~2~~ rasuk seperti **Rajah S2** di **Lampiran II** yang telah disediakan tetulang 4T20. Kekuatan muktamad konkrit, $f_{cu} =40 \text{ N/mm}^2$ dan kekuatan alahan tetulang, $f_y=460 \text{ N/mm}^2$. (20 markah)
- Q2 *Based on **Figure Q2** in **Appendix II**, calculate the resistance moment of beam section which using tension reinforcement 4T20. The ultimate concrete strength, $f_{cu} =40 \text{ N/mm}^2$ and reinforcement yield strength $f_y= 460 \text{ N/mm}^2$ is used.* (20 marks)
- S3 Merujuk pada **Rajah S3** di **Lampiran II**, sejenis rasuk direkabentuk untuk merintang momen lentur, dengan kekuatan ~~2~~ perangkai $f_{yv}=250 \text{ N/mm}^2$ dan kekuatan muktamad konkrit $f_{cu} =30 \text{ N/mm}^2$. Rekabentuk susunan perangkai di dalam rasuk. (20 markah)
- Q3 *Referring to **Figure Q3** in **Appendix II**, a beam that designated for resistance bending moment with stirrup characteristic strength, $f_{yv}=250 \text{ N/mm}^2$, and ultimate concrete strength $f_{cu} =30 \text{ N/mm}^2$. Design stirrup arrangement in the beam.* (20 markah)

S4 Jelaskan maksud perkara-pekerja berikut dalam kerja rekabentuk konkrit bertulang menurut BS8110 :

- | | |
|---------------------------------|--------------|
| (a) Keadaan Had Muktamad | (2.5 markah) |
| (b) Keadaan Had Kebolehhidmatan | (2.5 markah) |
| (c) Beban Mati | (2.5 markah) |
| (d) Beban Kenaan | (2.5 markah) |
| (e) Beban Angin | (2.5 markah) |
| (f) Tetulang Kekurangan | (2.5 markah) |
| (g) Keratan Imbang | (2.5 markah) |
| (h) Tetulang Lebihan | (2.5 markah) |

Q4 *Describe the meaning of the terms below according to the design work in of concrete reinforcement BS8110.*

- | | |
|--|--------------------|
| <i>(a) Ultimate Limit State.</i> | <i>(2.5 marks)</i> |
| <i>(b) Serviceability Limit State.</i> | <i>(2.5 marks)</i> |
| <i>(c) Dead Load</i> | <i>(2.5 marks)</i> |
| <i>(d) Imposed Load</i> | <i>(2.5 marks)</i> |
| <i>(e) Wind Load</i> | <i>(2.5 marks)</i> |
| <i>(f) Under-reinforced</i> | <i>(2.5 marks)</i> |
| <i>(g) Balance Section</i> | <i>(2.5 marks)</i> |
| <i>(h) Over Reinforced</i> | <i>(2.5 marks)</i> |

S5 Struktur kerangka mengganggu daya-daya dalaman pada setiap anggota iaitu anggota Tegangan, anggota Mampatan atau Sifar.

(a) Merujuk **Rajah S5(a)** di **Lampiran III**, nyatakan daya dalaman pada F_{AC} , F_{AD} , F_{BC} dan F_{BD} .

(4 markah)

(b) Merujuk **Rajah S5(b)** di **Lampiran III**, nyatakan daya dalaman pada F_{AC} , F_{AD} , F_{BC} dan F_{BD} .

(4 markah)

(c) Merujuk **Rajah S5(c)** di **Lampiran III**, nyatakan daya dalaman pada F_{AB} , F_{BC} , F_{AE} , F_{BE} , F_{CE} dan F_{AD} .

(6 markah)

(d) Merujuk **Rajah S5(d)** di **Lampiran III**, nyatakan daya dalaman pada F_{AB} , F_{BC} , F_{CD} , F_{DE} , F_{EA} dan F_{BE} .

(6 markah)

Q5 *Deformable body support internal forces which acting within each bodies, whether it Tension body, Compression body or Zero.*

(a) *Base on Figure Q5(a) in Appendix III, describe internal forces which acting at F_{AC} , F_{AD} , F_{BC} and F_{BD} .*

(4 marks)

(b) *Base on Figure Q5b(a) in Appendix III, describe internal forces which acting at F_{AC} , F_{AD} , F_{BC} and F_{BD} .*

(4 marks)

(c) *Base on Figure Q5(c) in Appendix III, describe internal forces which acting at F_{AB} , F_{BC} , F_{AE} , F_{BE} , F_{CE} and F_{AD} .*

(6 marks)

(d) *Base on Figure Q5(d) in Appendix III, describe internal forces which acting at F_{AB} , F_{BC} , F_{CD} , F_{DE} , F_{EA} and F_{BE} .*

(6 marks)

**KERTAS SOALAN TAMAT
END OF QUESTION PAPER**

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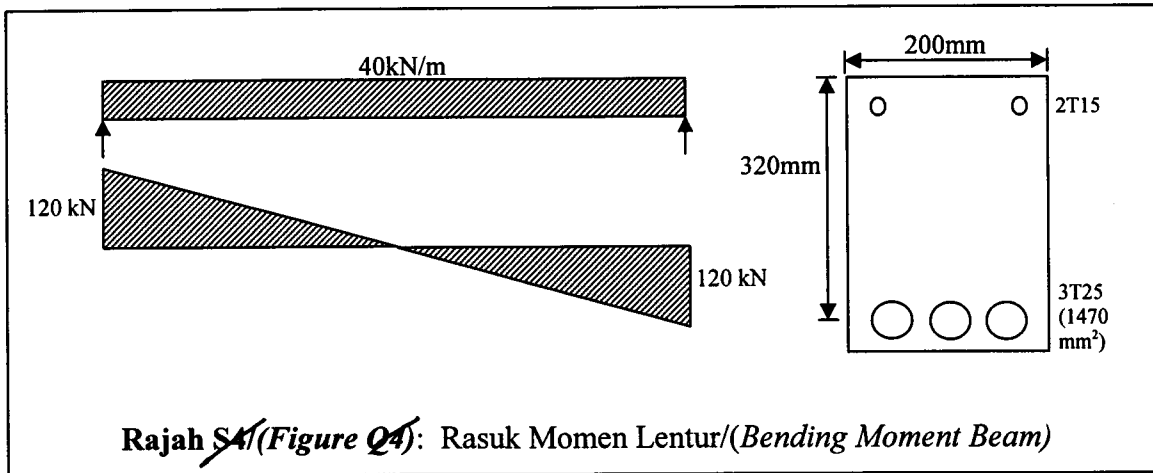
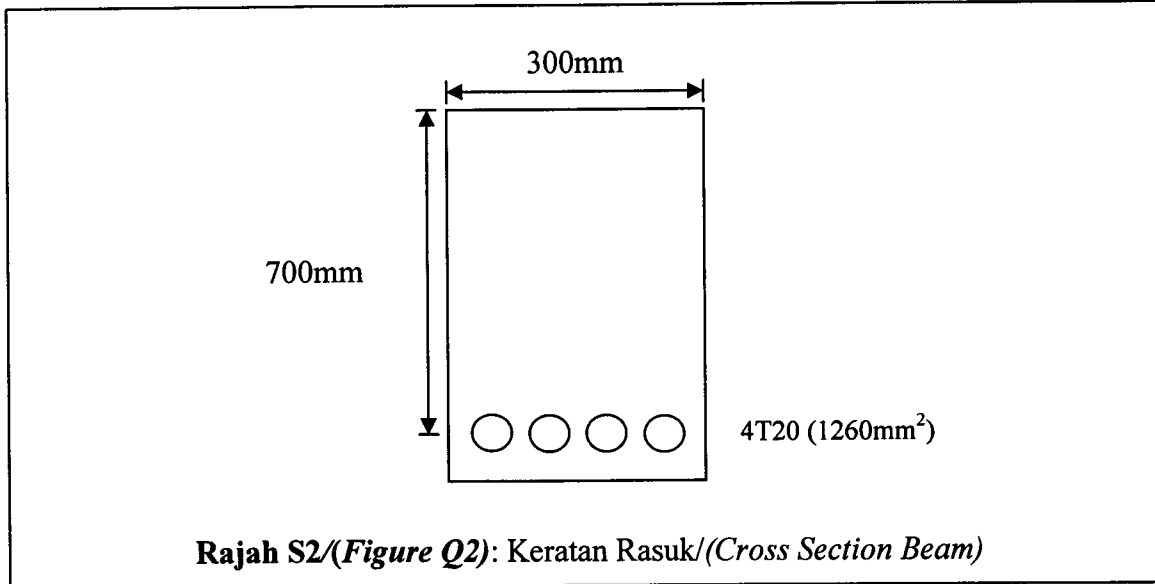
Bilangan Tetulang / <i>Bar Amount</i>	Luas Keratan Rentas (mm ²) / <i>Cross Sectional Area (mm²)</i>
2	628
3	942
4	1256
5	1570
6	1884

Jadual S1: Jadual Luas Keratan Rentas Tetulang T20
(Table Q1): Table of Cross Sectional Area T20 Reinforcement

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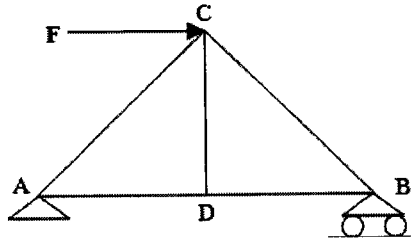


Q3 Q4

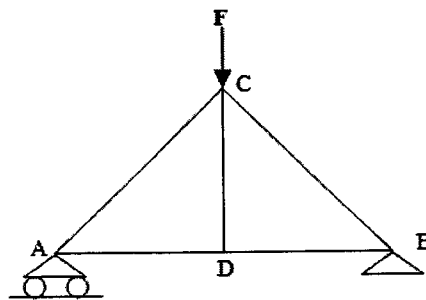
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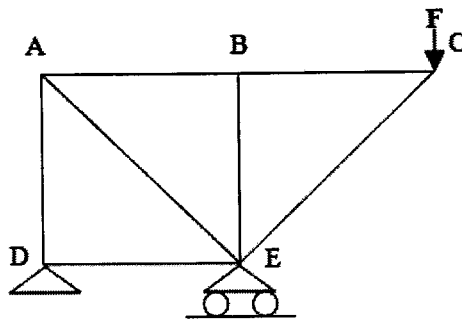
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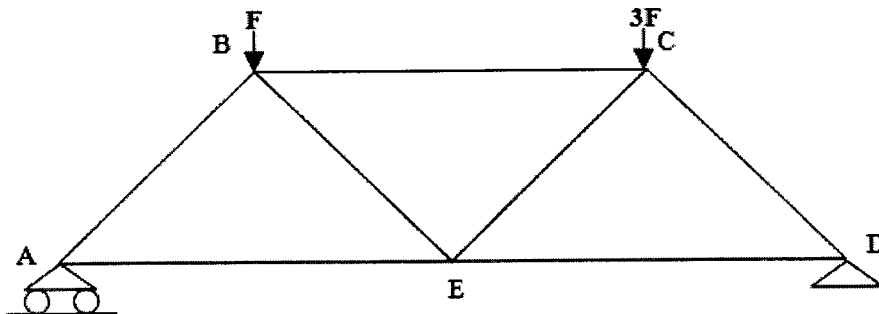
Rajah S5(a)/Figure Q5(a): Struktur Kerangka / Frame Structure



Rajah S5(b)/Figure Q5(b): Struktur Kerangka / Frame Structure



Rajah S5(c)/Figure Q5(c): Struktur Kekuda / Truss Structure



Rajah S5(d)/Figure Q5(d): Struktur Kekuda Satah / Plane Truss Structure