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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2012/2013**

COURSE NAME : STRUCTURAL DESIGN
COURSE CODE : BPD 3082 / BPD 30802
PROGRAMME : 3 BPC
EXAMINATION DATE : DECEMBER 2012 / JANUARY 2013
DURATION : 2 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF ELEVEN (11) PAGES

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UNIVERSITI TUN HUSSEIN ONN MALAYSIA
PREPARATION OF FINAL EXAMINATION QUESTION PAPER

SECTION A

(To be filled in by the Academic Staff)

Examination : Semester 0 II / III Session 12 / 13

1.0 Name 1. HEZIL MANSOR 2911 / 019 - 3884415
(IN CAPITAL LETTERS) (Extn. Tel/HP)

2. _____
(IN CAPITAL LETTERS) (Extn. Tel/HP)

3. _____
(IN CAPITAL LETTERS) (Extn. Tel/HP)

Course Code : BPD3082 / BPD30802
(State other codes, if any)

Course Name : STRUCTURE DESIGN

Duration of Examination : 2 hour(s) - _____ minute(s)

Number of Students : 120 person(s)

Language : Bahasa Malaysia English

(Questions in English must be accompanied by its translation in Bahasa Malaysia)

2.0 This Draft consists of:

1. Subjective Questions : pages 02

2. Diagrams : pages 03

3. Plans : pages

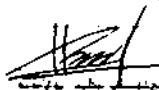
4. Charts : pages

5. Objective Questions : pages

3.0 Reference materials and other necessary items to be provided by the PPA:-

	No. of Units Required
1. _____	_____
2. _____	_____
3. _____	_____


4.0 Other instructions:


Signature and Official Stamp

23/11/12
Date

SECTION B
(For the Dean/Head of Centre)

5.0 This question paper has been checked and is hereby approved for distribution in the Semester 0 II / III examination of the 12 / 13 Session.


Signature of Dean/Head of Centre
and Official Stamp
DR. ETA BIRTI WAJID
Timultan Dekan (Akademik dan Antarabangsa)
Fakulti Pengurusan Teknologi dan Perniagaan
Universiti Tun Hussein Onn Malaysia

13/12/12
Date

Q1 Describe the meaning of the terms below according to the design work in of concrete reinforcement BS8110.

- (a) Ultimate Limit State. (5 marks)
- (b) Serviceability Limit State. (5 marks)
- (c) Under-reinforced (5 marks)
- (d) Balance Section (5 marks)
- (e) Over Reinforced (5 marks)

Q2 A cross section beam with the size 300 mm x 700 mm is carrying design moment of 300kNm.

Calculate the area and amount of bar to be required, by using **Figure Q2** in **Appendix I**, if ultimate concrete strength, $f_{cu} = 40 \text{ N/mm}^2$ and reinforcement yield strength $f_y = 460 \text{ N/mm}^2$ is used.

(25 marks)

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.

(25 marks)

Q4 Deformable body support internal forces which acting within each bodies, whether it Tension body, Compression body or Zero.

(a) Describe internal forces which acting at F_{AC} , F_{AD} , F_{BC} and F_{BD} , based on **Figure Q4(a)** in **Appendix III**.

(5 marks)

(b) Describe internal forces which acting at F_{AB} , F_{BC} , F_{AE} , F_{BE} , F_{CE} and F_{AD} , based on **Figure Q4(b)** in **Appendix III**.

(10 marks)

(c) Describe internal forces which acting at F_{AB} , F_{BC} , F_{CD} , F_{DE} , F_{EA} and F_{BE} , based on **Figure Q4(c)** in **Appendix III**.

(10 marks)

- **END OF QUESTION** -

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Bar Amount	Cross Sectional Area (mm ²)
2	628
3	942
4	1256
5	1570
6	1884

Figure Q2: Table of Cross Sectional Area T20 Reinforcement

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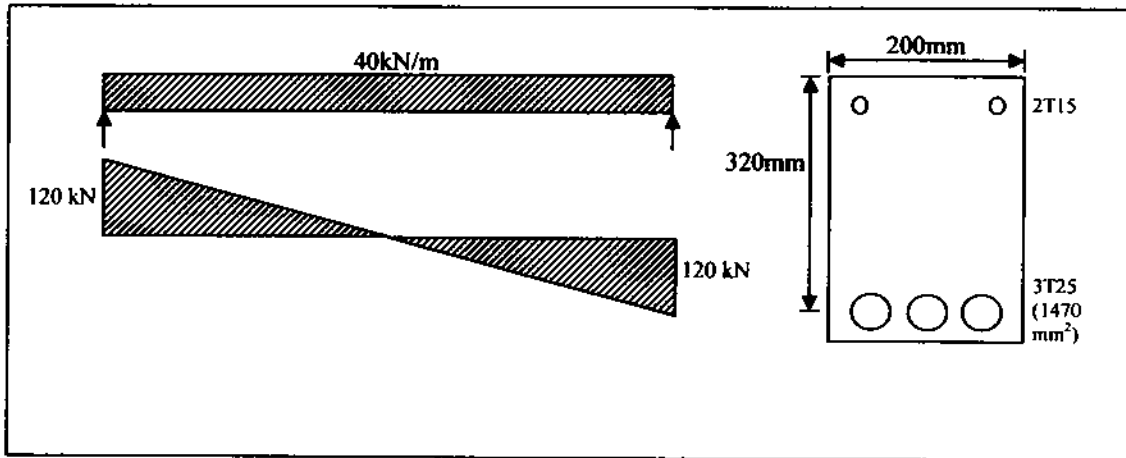


Figure Q3: Bending Moment Beam

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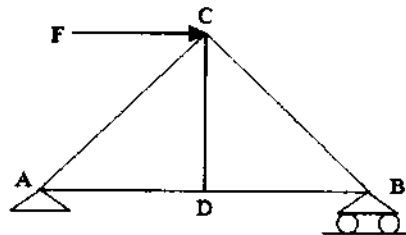


Figure Q4 (a): Frame Structure

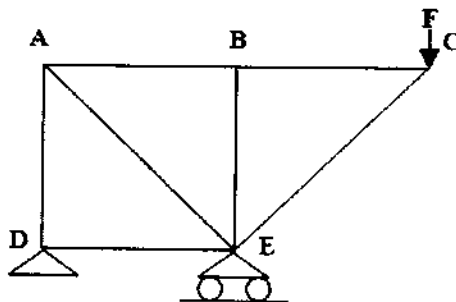


Figure Q4 (b): Truss Structure

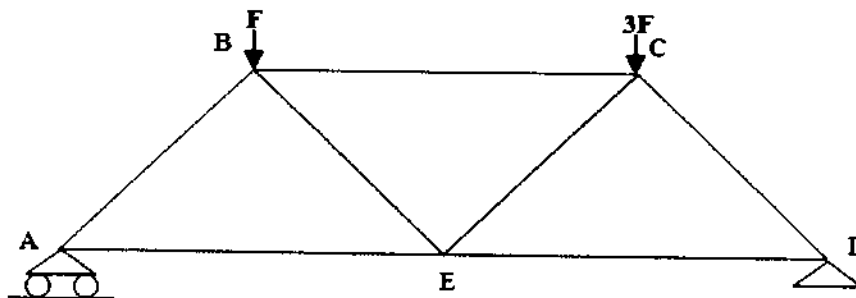


Figure Q4 (c): Plane Truss Structure

- S1** Jelaskan maksud perkara-perkara berikut dalam kerja rekabentuk konkrit bertetulang menurut BS8110 :
- (a) Keadaan Had Muktamad (5 markah)
 - (b) Keadaan Had Kebolehhidmatan (5 markah)
 - (c) Tetulang Kekurangan (5 markah)
 - (d) Keratan Imbang (5 markah)
 - (e) Tetulang Lebihan (5 markah)
- S2** Satu keratan rasuk segiempat bersaiz 300mm x 700mm dikehendaki menanggung momen rekabentuk sebesar 300kNm.
- Hitungkan luas dan bilangan tetulang yang diperlukan, dengan menggunakan **Rajah S1** di dalam **Lampiran I**, jika kekuatan muktamad konkrit, $f_{cu}=40 \text{ N/mm}^2$ dan kekuatan alahan tetulang, $f_y=460 \text{ N/mm}^2$.
- (25 markah)
- S3** Merujuk pada **Rajah S2** di **Lampiran II**, sejenis rasuk direkabentuk untuk merintang momen lentur, dengan kekuatan ciri 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.
- (25 markah)

S4 Struktur kerangka mengganggu daya-daya dalaman pada setiap anggota iaitu anggota Tegangan, anggota Mampatan atau Sifar.

(a) Nyatakan daya dalaman pada F_{AC} , F_{AD} , F_{BC} dan F_{BD} , dengan merujuk pada **Rajah S4(a) di Lampiran III**,

(5 markah)

(b) Nyatakan daya dalaman pada F_{AB} , F_{BC} , F_{AE} , F_{BE} , F_{CE} dan F_{AD} , dengan merujuk pada **Rajah S4(b) di Lampiran III**,

(10 markah)

(c) Nyatakan daya dalaman pada F_{AB} , F_{BC} , F_{CD} , F_{DE} , F_{EA} dan F_{BE} , dengan merujuk pada **Rajah S4(c) di Lampiran III**,

(10 markah)

PEPERIKSAAN AKHIR

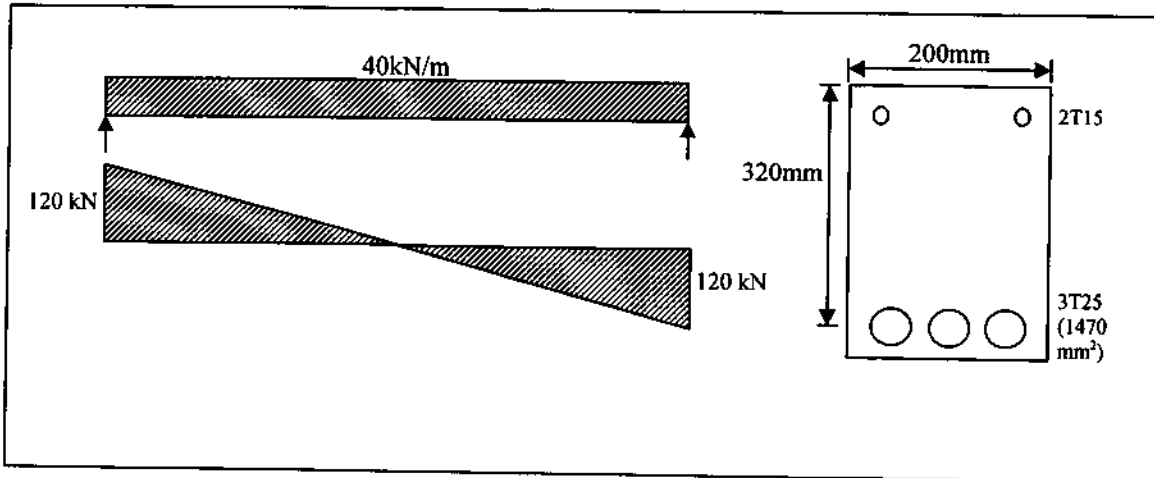
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Bilangan Tetulang / <i>Bar Amount</i>	Luas Keratan Rentas (mm ²) / <i>Cross Sectional Area (mm²)</i>
2	628
3	942
4	1256
5	1570
6	1884

Rajah S2: Jadual Luas Keratan Rentas Tetulang T20

PEPERIKSAAN AKHIR

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KURSUS : REKABENTUK STRUKTUR KOD KURSUS : BPD 3082 /BPD30802



Rajah S3: Rasuk Momen Lentur

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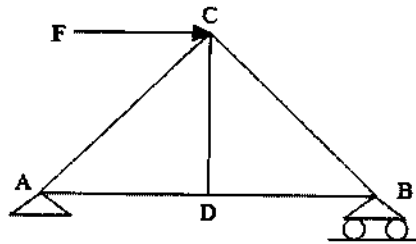
PROGRAM

: 3 BPC

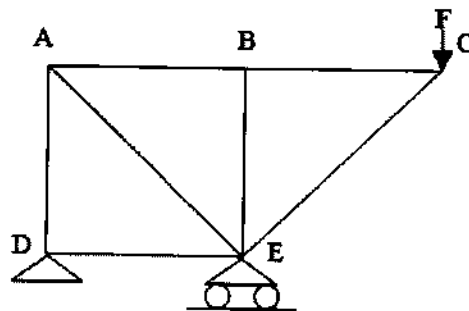
KURSUS : REKABENTUK STRUKTUR

KOD KURSUS

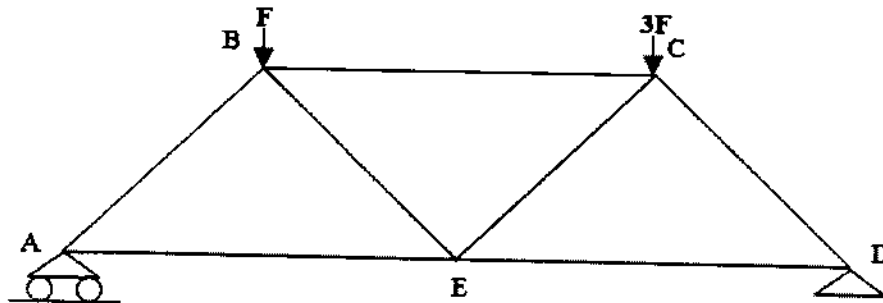
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Rajah S4 (a): Struktur Kerangka



Rajah S4 (b): Struktur Kekuda



Rajah S4 (c) : Struktur Kekuda Satah