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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**TEST 1
SEMESTER II
SESSION 2013/2014**

COURSE NAME : REINFORCED CONCRETE DESIGN I
COURSE CODE : BFC 32102 / BFC 3142
PROGRAMME : 3 BFF
EXAMINATION DATE : MAC 2014
DURATION : 1 HOUR 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS

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Q1. Answer the following questions.

(a) What is mean by limit state?

(5 marks)

(b) Explain the different type of limit states to be considered in reinforced concrete design.

(10 marks)

(c) Explain the term of design action and design strength.

(10 marks)

(d) Describe the term balanced, under-reinforced and over-reinforced in bending. Why it is undesirable to design over-reinforced section?

(15 marks)

Q2. Figure **Q2** shows the reinforced concrete beams subjected to uniformly distributed load throughout the spans. Determine the location of tension reinforcements for the beams.

(20 marks)

Q3. Figure **Q3** shows a rectangular cross section of doubly reinforced simply supported beam subjected to bending. The beam size is 250 x 450 mm with $d = 410\text{mm}$ and $d' = 30\text{mm}$.

(a) Sketch the simplified rectangular stress and strain block for the cross section beam in ultimate limit state.

(10 marks)

(b) Based on the simplified rectangular stress block, determine the ultimate moment resistance for the beam. Assume the characteristic strength of concrete and steel reinforcement is 30 MPa and 500 MPa respectively.

(30 marks)

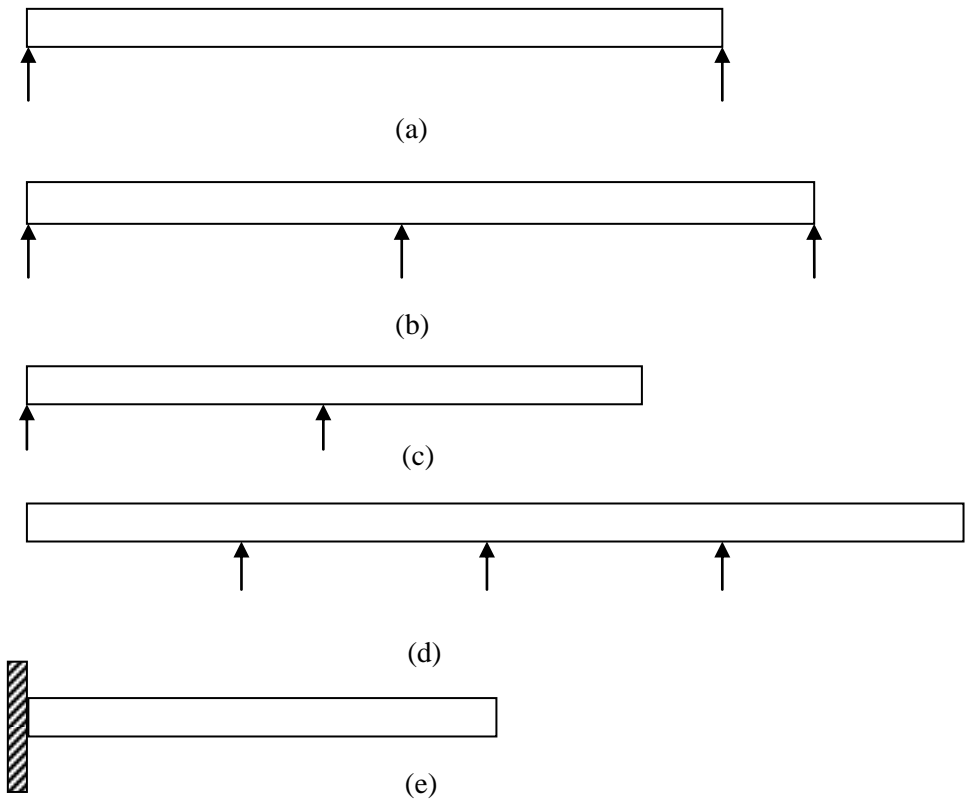


FIGURE Q2

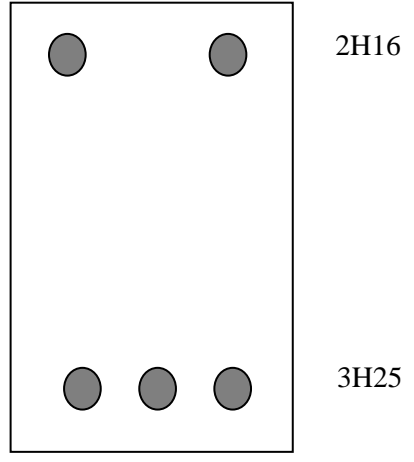


FIGURE Q3