TANTA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF STRUCTURAL ENGINEERING مدنى وإنشاءات لائحة جديدة
EXAMINATION (THIRD YEAR) STUDENTS OF CIVIL AND STRUCTURAL ENGINEERING

COURSE TITLE: DESIGN OF REINFORCED CONCRETE STRUCTURES (2) b			COURSE CODE: CSE3210/3223
DATE: MAY – 2013	TERM: SECOND	TOTAL ASSESSMENT MARKS: 75	TIME ALLOWED: 4 HOURS

For all problems consider that: f_{cu}=30MPa, St.400/600

Systematic arrangement of calculations and clear neat drawings are essential. Any data not given is to be assumed – Answer as many questions as you can

الإمتحان مكون من ٣ أسئلة فى صفحتين

PROBLEM # ONE (35 marks)

A

i- What are the disadvantages of a tension structures? **(2marks)**
ii- What is the main condition to ensure coinciding line of pressure on the following main supporting elements (MSE): arches - triangular shed - trapezoidal shed? **(2marks)**
iii- What is the effect of the horizontal reaction of the arches on its internal actions M, N and Q? **(2mark)**
iv- Illustrate with sketches the reason of choosing to uniform stresses under footing in a weak soil? **(2marks)**
v- What is the effect of post inclination on analysis of a saw – tooth roof structural system? **(2mark)**
vi- How can you measure the efficiency of the structural elements? What is the more efficient MSE and why? **(2mark)**

B. Fig. 1 shows an arched slab with a tie of span 16m supported on a columns of spacing, S= 6m. The total ultimate load of the tie, T_u, is 600kN. **Consider that**: the **ultimate live load** on the arched slab is, p_u, 1.6kN/m^2, the **ultimate additional load,** w_{add}, from the tie, hangers and stiffener is 5kN/m` and the **ultimate own weight** of the vertical and horizontal beams is 10kN/m`. It is required to carry out the following:
i- Determine the maximum total load, w_u, carried by the arched slab. **(6marks)**
ii- Determine the internal actions of all structural elements: arch slab – vertical beam – horizontal beam and the column. **(6marks)**
iii- Design the critical section of the column only if its width 300mm. **(3marks)**

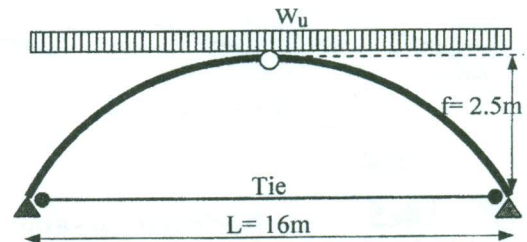

Fig. 1 Strip= 1m wide of arch slab

C. Fig. 2 shows a Vierendeel girder of span 30m. It is required to carry out the following: Draw B.M., S.F. and N.F. diagrams of the V.G under the given loads. Draw the shape of reinforcement **without any calculations** of the part marked (A). **(8marks)**

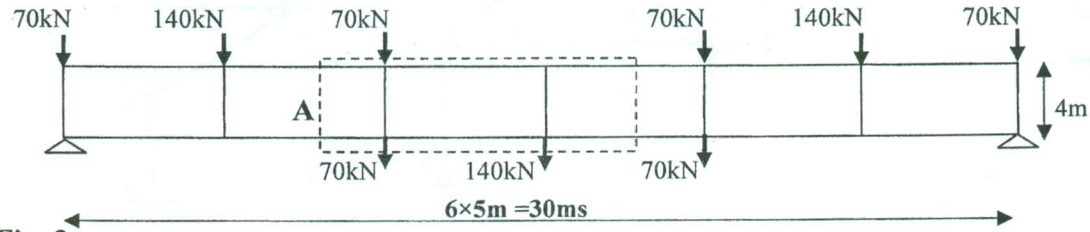

Fig. 2

PROBLEM # TWO (34marks)

A. Fig. 3 shows layout of sectional elevation of an industrial hall (15×40m). Two roofs **ABC** and **DE** are required to cover the hall. Also, a side park **FG** 4m is required. The columns are placed at **AH** and **EI** only at spacing 6m. It is required to carry out the following:
i- Suggest suitable systems of the main supporting elements, **MSE,** and the slab type for each roof. **(4marks)**
ii- Draw to reasonable scale a sectional elevation showing all necessary structural elements and its concrete dimensions. **(5marks)**
iii- Using diagrammatic sketches and without any calculations, illustrates the load transfers from the slabs to foundations. If uniform stress is required under the foundations, locate its axes related to the column axes and draw its reinforcement with the columns. **(5marks)**

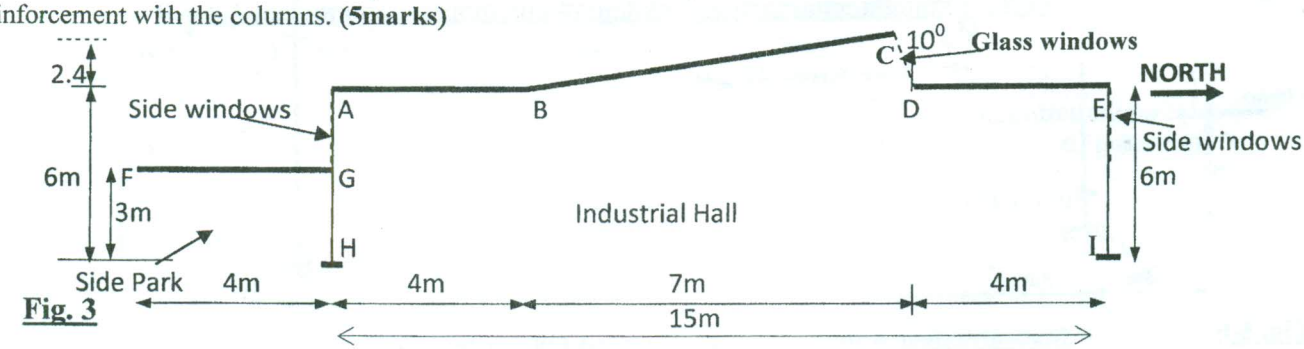

Fig. 3

Please Turn Over ⟶