KAFR ELSHKEIH UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING
STRUCTURAL ANALYSIS (2)
FINAL EXAMINATION

DATE: 15/1/2018
TIME ALLOWED : 3 HOURS
FULL MARK = 85 POINTS
ACADEMIC NUMBER :CES2006
PROF.DR. MOHAMED NAGUIB ABOU EL SAAD

Any data missing may be assumed MAXIMUM CREDIT = 85 POINTS

Question 1: 12(5+7)points

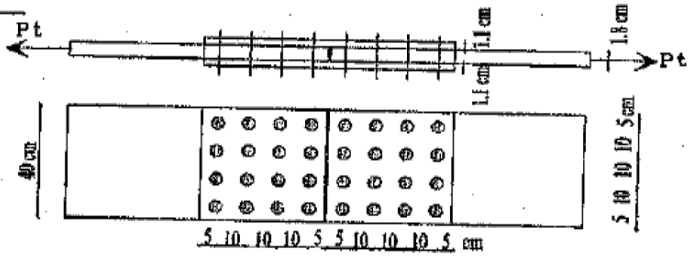

Fig.(1)

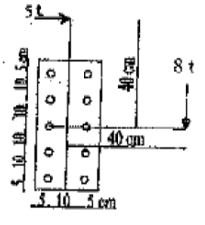

Fig.(2)

1) For steel plate splice shown in Fig.(1) compute the failure load P.
The diameter of rivets = 20 mm with $R_{S.S}$ = 3 tons and R_b = 5 tons.
The allowable tensile stress in plate = 1.4 t/cm.

2–For the riveted bracket connection shown in Fig.(2),
name the rivets having the maximum and minimum forces, mentioning their values.

Question 2: 13 points

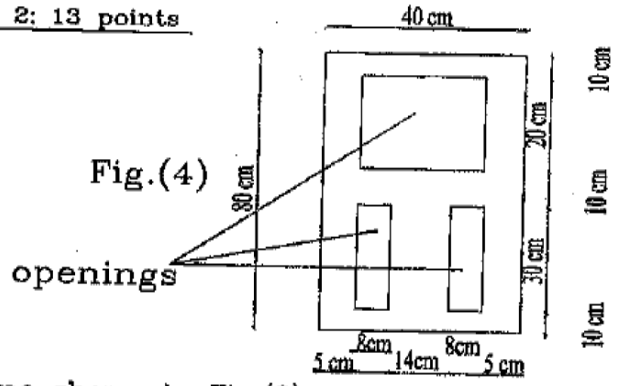

Fig.(4)

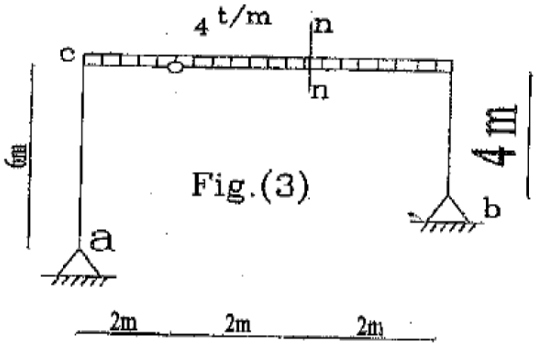

Fig.(3)

For frame shown in Fig.(3) with cross section of beam shown in Fig.(4), draw the shear stress distribution at sections n–n.

Question 3: 10 points

For the beam shown in Fig(5) with cross–section shown in Fig.(6), locate the shear center at point c.

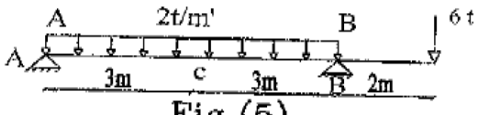

Fig.(5)

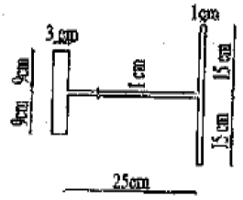

Fig.(6)

Question 4: 10 points

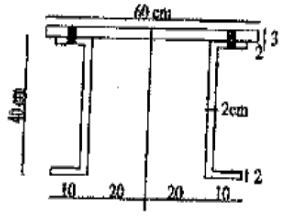

Fig.(8)

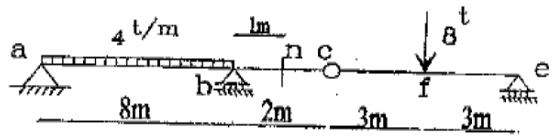

Fig.(7)

If the beam shown in Fig.(7), has the cross-section shown in Fig.(8), specify the spacing for the rivets necessary to fasten all parts together . The resistance for each rivet = 5 tons.

Question 5: 15(9+6) points

1-Find the weight ratio of hollow shaft with a 40 cm diameter solid one if the two shear stress. For the hollow section take the inner diameter equals 0.6 of outer diameter.

2-For stresses shown in Fig.(9), compute the principal normal and shear stresses.

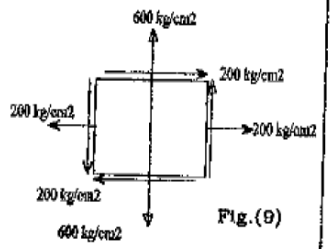

Fig.(9)

Question 6: 10 points

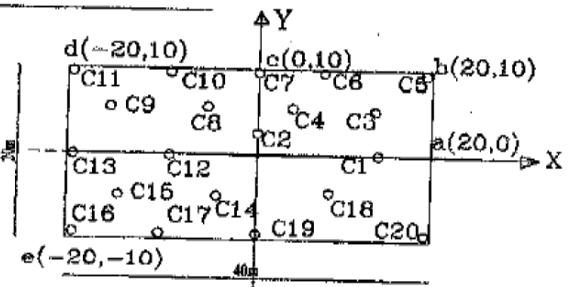

Fig.(10)

Column	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
load,t	100	20	90	80	90	30	90	90	60	130	100	80	120	150	120	90	40	70	110	180
x-axes (meter)	15	0	15	5	20	10	0	-5	-15	-10	-20	-10	-20	-5	-15	-20	-10	10	0	20
y-axes m	0	2	5	5	10	10	10	5	5	10	10	0	0	-5	-5	-10	-10	-5	-10	-10

For the raft foundation show in Fig.(10) which carries a twenty columns , find the combined stresses at points a, b, c, d, and e.
The locations of all columns and their loads are given in the above table.

Question 6: 15 points

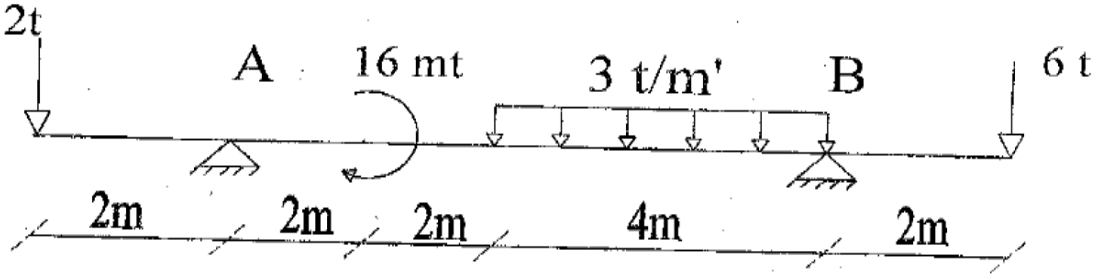

Fig.(11)

For the beam shown in Fig.(11), derive the rotation and deflection expressions and then compute the maximum deflection and its location. (Use the double integration method)