



NOTE: ATTEMPT FIVE QUESTIONS ONLY INCLUDING QUESTION FIVE & SIX

Q1. Draw the following relation with details:

10 degrees

- 1- Effect of temperature curing on O.G.C with time.
- 2- Drying shrinkage with aggregate content.
- 3- Effect of (w/c) on workability of concrete with different fine aggregate content.
- 4- Effect of (MaO) on expansion of cement.
- 5- Strength of main components of cement with time.

Q2. /A. Fill the blanks:

5 degrees

- 1- Blain is .....
- 2- Le chatlier is .....
- 3- Fatigue strength is .....
- 4- Secant modulus is .....
- 5- Bleeding is .....

B. Explain the main methods to produce lightweight concrete.

5 degrees

Q3. /A. For the fine aggregate sample below, find the grading and compare it with (I.Q.S) then find fineness modulus.

5 degrees

Sieve size(mm)	9.5	4.75	2.36	1.18	0.6	0.3	0.15	Pan
Returned weight (gm)	0	45	135	120	83	65	56	20
I.Q.S ZONE( 2)	100	100-90	100-75	90-55	59-35	30-8	10-0	

B. Define Creep and show with sketches, the factors affect on it.

5 degrees

Q4. /A. Determine  $C_2S$ ,  $C_3A$  and  $C_4AF$  from oxides below,  $C_3S = 61.08$

5 degrees

Oxides	CaO	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	SO <sub>3</sub>
Content %	59.8	21.1	4.18	2.6	2.34

B. show the factors affect on setting.

5 degrees

Q5. Designed a mix according to ACI 211.1-91 with a mean 28 day compressive strength measured on cylinder with (35) MPa and slump (75) mm. The max. size of coarse aggregate is (25)mm. ,bulk density is 1600 Kg/m<sup>3</sup> with specific gravity (S.G =2.7).For fine aggregate ,fineness modulus is (2.5) and (S.G=2.5).No air entrained in the mix. Determine mix proportion by weight and by volume.

20 degrees

Q6. Compressive failure loads for (150x150x150) mm cubes was (60000, 72000, 55000) lb, find:

- a. Average compressive strength
- b. Failure average load in pound for the corresponding cylinder.

10 degrees

Q2 B 1. using light weight porous with slow s.g agg.

2. formation large gaps between concrete

3. exclusion of fine agg.

(2)

Q3 A

	4.75	2.36	1.18	0.6	0.3	0.15
passing %	91.4	65.65	42.75	26.91	14.5	3.82

الوزن  
الحالي  
(524)

3.55 = F.M

كثافة

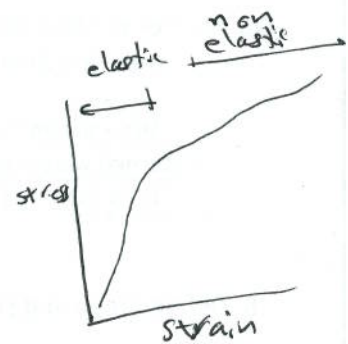
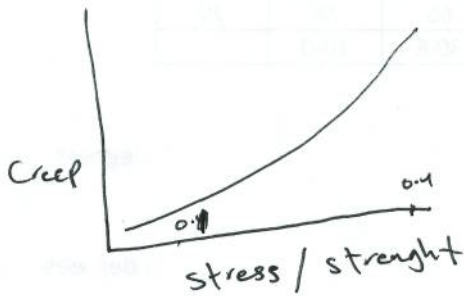
Q3 B Creep is the increase in strain with time under asustained stress.

Factors affecting on creep is ① time

② type of concrete

③ stress / strenght

④ humidity



Q4 A  $C_{3A} = 7.904$   $C_{3A} = 6.683$   $C_{2S} = 14.5$

① w/c ② Temp & humidity

③ Fineness of cement

④ chemical composition

⑤ slump = 75 max. size = 25  $\Rightarrow$  water = 193 kg/m<sup>3</sup> air %1.5

$\frac{W}{C} = 0.47 \Rightarrow C = 410 \text{ kg/m}^3$

Coarse agg  $\Rightarrow$  max size 25

F. fine = 0.247  $\approx$  0.25

2.5 \* 0.25 \* 1000 = 625 kg/m<sup>3</sup>

F.M = 2.5  $\Rightarrow$  0.7 \* 1600 = 1120

mix proportion by weight

	410	625	1120
	410	410	410

1: 1.52 : 2.73