ملزمة الدكتور ١،٢،٥
مراجعة المراجعة العربي

Mix Design

مطلوب مني حساب وزن الركام (رمل - زلط) - وزن الاسمنت
وزن المياه - نسبة المياه الي الاسمنت (w/c)

لازم اعمل الكلام ده في جدول ←

كثافة الاسمنت 3.150

W_{water}	W_{cement}	W_{fine}	W_{coars}	(w/c)
✓ L/m³	✓ kg/m³	✓ kg/m³	✓ kg/m³	✓

خطوات الحل

① حساب المقاومة المستهدفة (Target Mean strength)

$$F_M = F_{cu} + M$$

M → معامل أمان
120 kg/cm²
فقط 12 N/mm² (MPa)

② حساب كمية المياه اللازمة (Water Content) W_w

من جدول رقم 4:2

* باستخدام (بدلالة)

① slump
② Max Agg size
③ Type of Agg

لازم اكتب انا استخدم الجدول بدلالة ايه ←

③ حساب نسبة المياه للأسمنت (w/c) water/Cement ratio)

* تحسب مقاومة ضغط الخرسانة عند $(w/c) = 0,5$

← جدول 4.1 باستخدام (المدخلات)

① نوع الأسمنت — Type of Cement → OPC / SRPC / RHPC

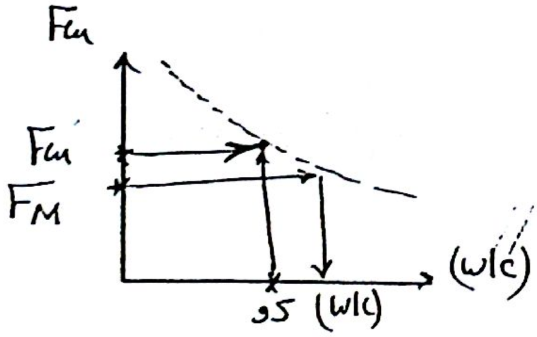
② نوع الركام — Type of Agg

③ بعد كام يوم — 28 لو مش بنزل

∴ $F_{cu} = ?$ MPa → at $w/c = 0,5$

* مطلوب ارسم منحنى (curve) علشان اطلع (w/c) بتاعت المسألة المطلوبة

← منحنى رقم 4.1



← نوقع (w/c) = 0,5 (Fcu) اللي حسبناه من الجدول السابق

← ارسم منحنى يمر بالنقطة التقاطع

← اوقع (FM) وامشي افقي لحد ما اقطع المنحنى اللي رسمته وانزل رأسي اجيب (w/c)

خلي بالك ←

$(w/c) < (w/c)_{max}$ ← اشتغل (w/c) باقي المسألة

$(w/c) > (w/c)_{max}$ ← " $(w/c)_{max}$ باقي المسألة

④ حساب كمية الأسمنت (Wc) (Cement Content)

$$W_{cement} = \frac{W_{water}}{(w/c)}$$

خلي بالك مهم

* $W_{cement} < (W_{cement})_{max}$ → ok

كمل المسألة

* $W_{cement} > (W_{cement})_{max}$ → $W_c = (W_c)_{max}$

↓

وأرجع اعدل (W/C)

لو طلب أفرض

أكبر (W/C) بعد التعديل

من $(W/C)_{max}$ ← أستغل ب $(W/C)_{max}$

مهم

ما لم يذكر يتم استخدام اضافات

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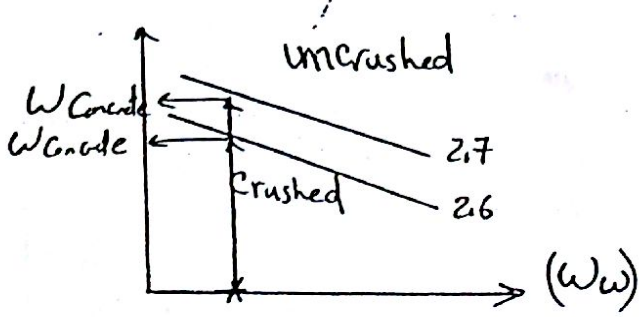
⑤ حساب الركام الكلي Coars والصغير Fine

لحساب وزن الخرسانة كلها → المنحنى رقم 4.2

بدلالة

① Water Content

② Type of Agg



$W_{concrete}$ = ✓ من المنحنى

$W_{concrete} = W_w + W_c + W_{Agg}$ → $W_{Agg} =$

✓✓ ✓✓ ✓✓ ???

تحسب نسبة الرمل

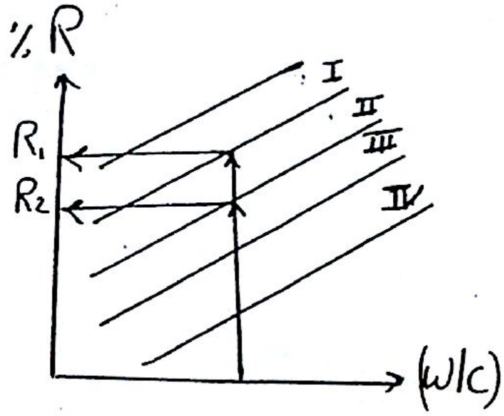
يعتمد 4.3 chart

بدلالة

1. Slump
2. Max Agg size
3. Zone no

نسبة الرمل المتوسطة

$$R = \frac{R_1 + R_2}{2} \quad \%$$



$$\therefore W_{fine} = \frac{R}{100} * W_{Agg}$$

$$W_{coarse} = W_{Agg} - W_{fine}$$

ملحوظة لو طلب حساب الحجم

$$V_w = \frac{W_w}{1000} \quad m^3/m^3$$

$$V_{cement} = \frac{W_{cement}}{\gamma_{cement}} \quad m^3/m^3$$ (γ_{cement} ← given)

$$W_{sand} = \frac{W_{fine}}{\gamma_{sand}} \quad m^3/m^3$$ (γ_{sand} ← given)

$$W_{gravel} = \frac{W_{coars}}{\gamma_{gravel}} \quad m^3/m^3$$ (γ_{gravel} ← given)

لازم اعلم في جدول

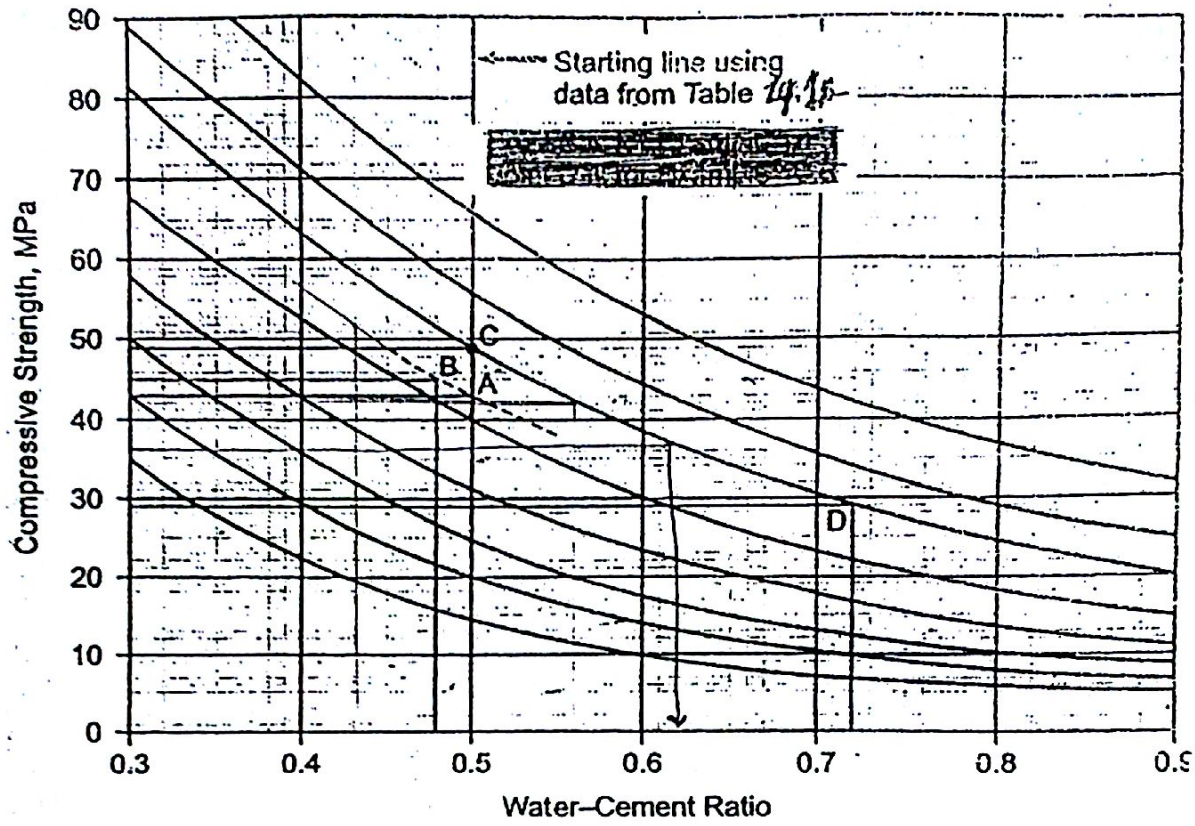


Fig. 4.1 Relation between compressive strength and water-cement ratio

Table 4.1 Approximate compressive strength (kg/cm2)of concrete mixes with a water-cement ratio of 0

Type of cement	*Type of course aggregate*	*Compressive strength (MPa) Age (days)*			
		3	*7*	*28*	*91*
Ordinary (CEM 1) or sulphate resisting cement (SRPC)	Uncrushed	22	30	43	49
	Crushed	27	36	49	56
Rapid-hardening Portland cement	Uncrushed	29	37	48	54
	Crushed	34	43	55	61

Table 4.2 Approximate free-water contents (kg/m3) required to various levels of workability

Slump(mm) / V.B (sec)		0 – 10 / >12	10 – 30 / 6 – 12	30 – 60 / 3 – 6	60 – 180 / 0 - 3
Maximum size of coarse aggregate (mm)	Type of aggregate				
10	Uncrushed	150	180	205	225
	Crushed	180	205	230	250
20	Uncrushed	135	160	180	195
	Crushed	170	190	210	225
40	Uncrushed	115	140	160	175
	Crushed	155	175	190	205

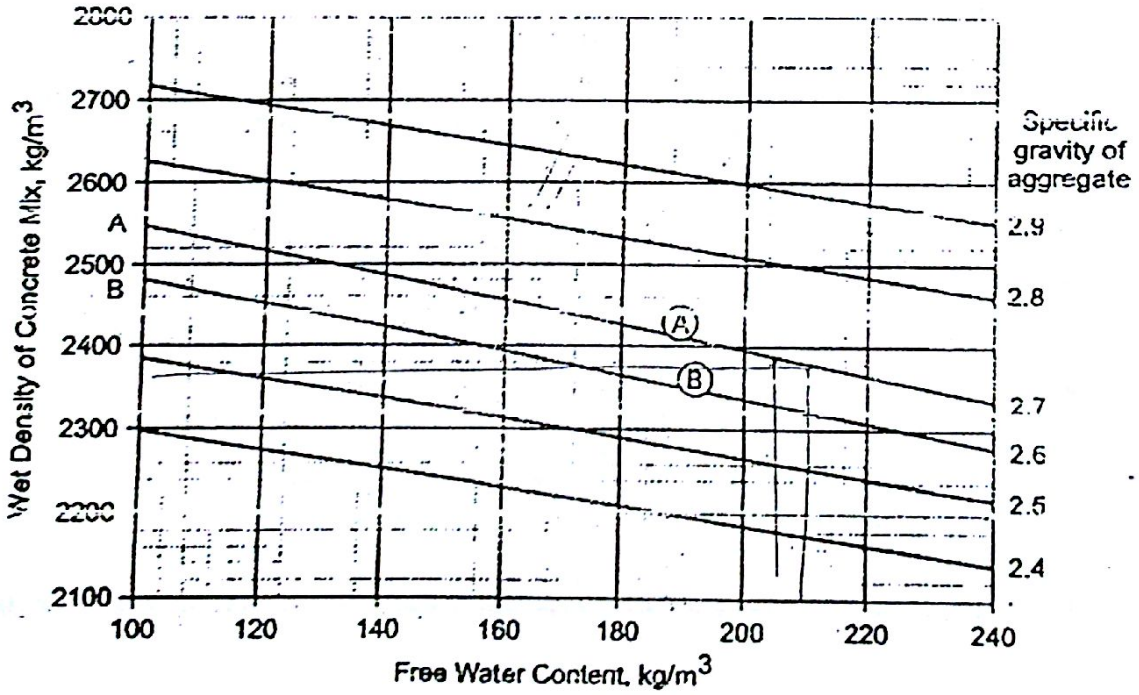
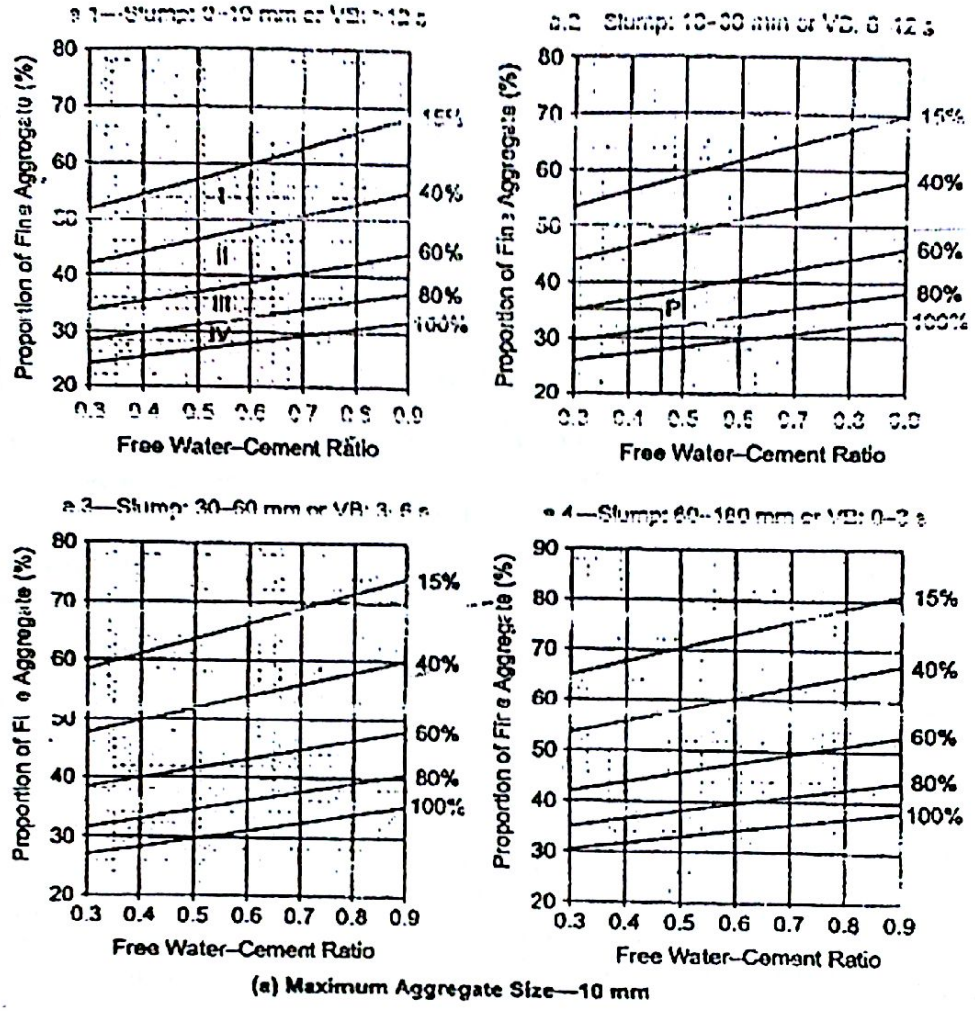


Fig. 4.2 Estimated wet density of fully compacted concrete

(6)



(a) Maximum Aggregate Size—10 mm

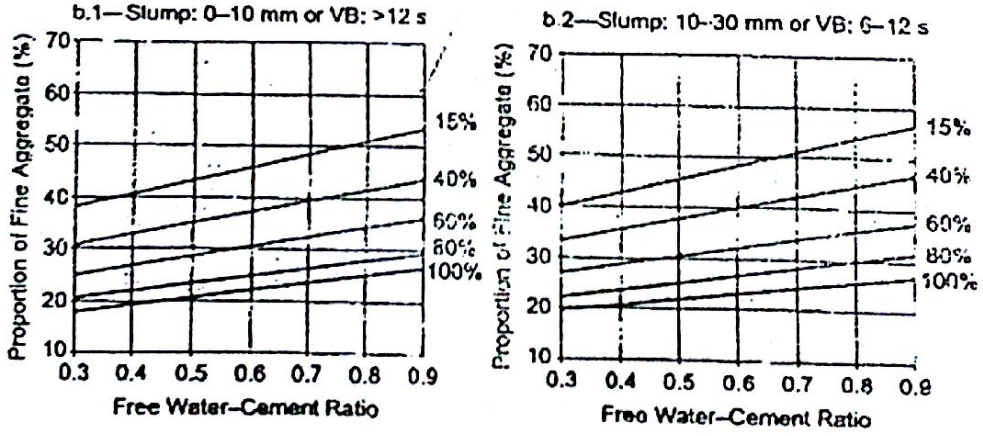
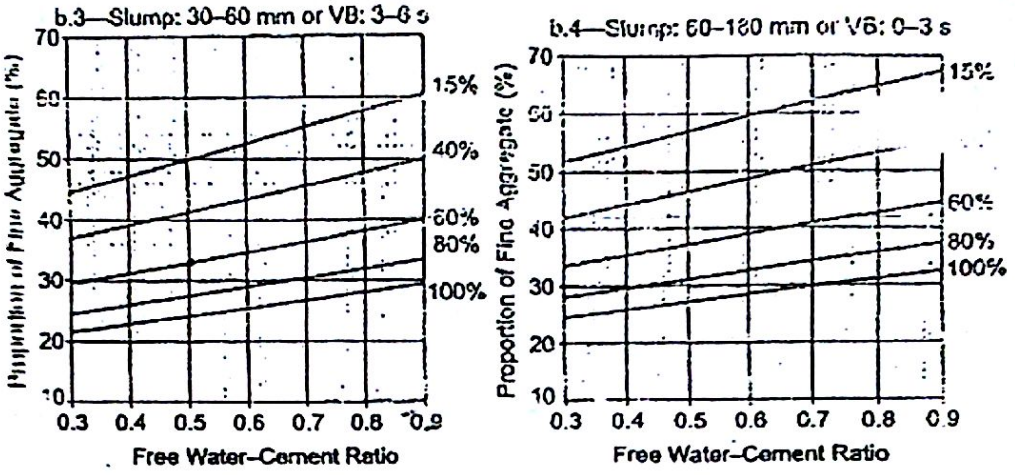
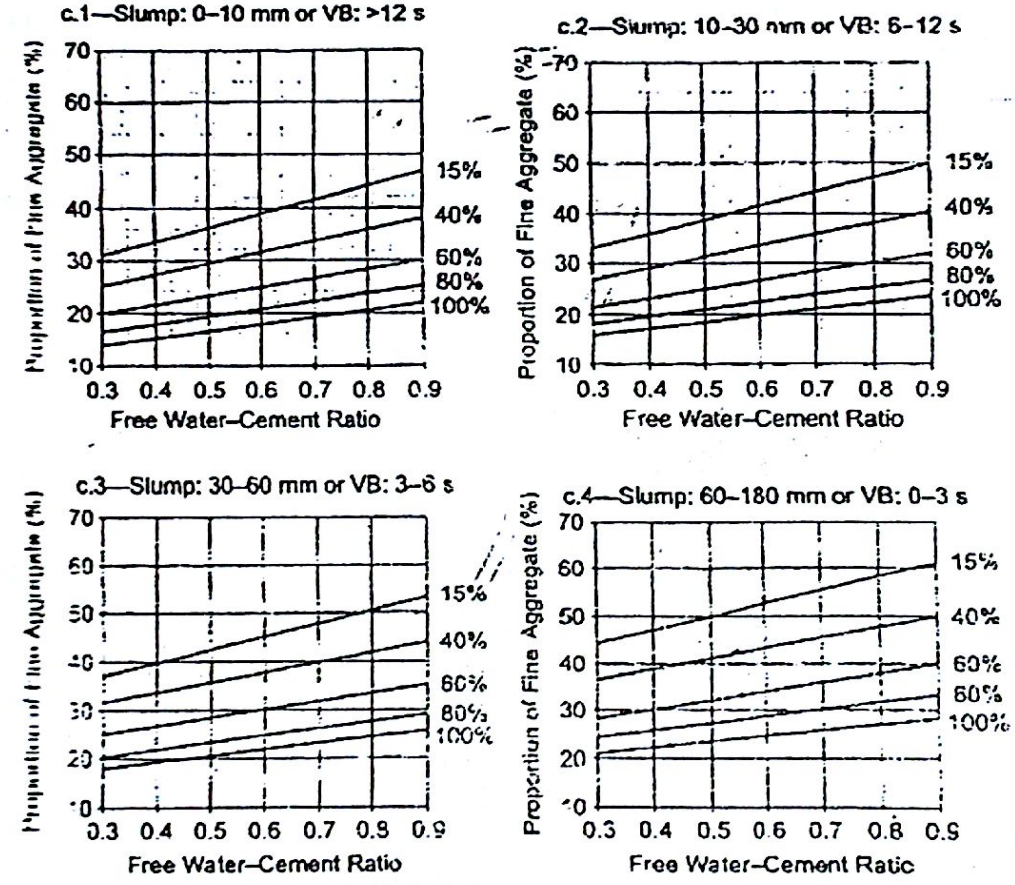


Fig. 4.3 Recommended proportions of fine aggregate for grading zones 1, 2, 3, 4 (I, II, II, IV)

(7)



(b) Maximum Aggregate Size—20 mm



(c) Maximum Aggregate Size—40 mm

Fig. 4.3 Cont.

شيت الدكتور هام جداً

F_{cu}	Slump	Cement Type	Type of Agg	Max Agg size	Zone	$(w/c)_{max}$	$(W_c)_{max}$	$(W_c)_{min}$
30	60-100	OPC	Crushed	40	2	0.55	350	250

① F_M

$$F_M = 30 + 12 = 42 \ (MPa) = N/mm^2$$

② W_{cw}

جدول 4.2 بدلالة

1. Slump 60-100
2. Agg Type Crushed
3. Max Agg size 40

$$W_{cw} = 205 \ kg/m^3$$

③ (w/c)

احسب F_{cu} ← عند $(w/c) = 0.5$

جدول 4.1 بدلالة

1. Type of Cement OPC
2. Agg Type Crushed
3. 28 day

$$F_{cu} = 49 \ (MPa)$$

منحنى رقم 4.1

$(w/c) = 0.5 \longrightarrow F_{cu} = 49$

$??? \longleftarrow F_M = 42$

$(w/c) = 0.57 > (w/c)_{max} = 0.55$

$$\therefore (w/c) = (w/c)_{max} = 0.55$$

$$W_c = \frac{W_w}{(w/c)} = \frac{205}{0.55}$$ W_{cement} ②

$$\boxed{W_c = 372.7 \text{ kg/m}^3} > (W_c)_{max} = 350$$

(∴ Take $W_c = 350$ kg/m³)

(w/c) بعد التعديل $= \frac{W_w}{W_c} = \frac{205}{350} = 0.585 > (w/c)_{max} = 0.5$

تم استخدام اضافات ← $(w/c) = 0.55$

W_{Agg} ⑥

Agg Type Crushed ①
$W_w = 205$ ⑤

بدلالة .. 4.2 من ← $(W_{Concrete})$ في

$$\boxed{W_{Concrete} = 2350 \text{ kg/m}^3}$$

$$W_{Concrete} = W_w + W_c + W_{Agg}$$
$$2350 = 205 + 350 + W_{Agg} \longrightarrow \boxed{W_{Agg} = 1795 \text{ kg}}$$

Slump 60 to 100 ①
Agg Size 40 ③
Zone 2 ④

بدلالة // 4.3 من نسبة الرمل

$$R = \frac{32 + 42}{2} = 37\%$$

$$\therefore W_{fine} = W_{Agg} * R$$
$$= 1795 * \frac{37}{100} \longrightarrow \boxed{W_{fine} = 664 \text{ kg/m}^3}$$

$$\therefore W_{Coars} = 1795 - 664 \quad \boxed{W_{Coars} = 1131 \text{ kg/m}^3}$$

لازم اعمل الجدول

W_w	W_c	(w/c)	W_{sand}	W_{gravel}
205 l/m³	350 kg/m³	0.55	664 kg/m³	1131 kg/m³

⑩

F_{cu}	slump	Cement Type	Agg Type	Max Agg	Zone	$(w/c)_{max}$	$(w_c)_{max}$	$(w_c)_{min}$
40	10-30	SRPC	un Crushed	20	2	0.5	300	250

① F_M

$F_M = 40 + 12 = 52\ (MPa)$

③ w_w ← 4.2 جدول رقم

$w_w = 160\ kg/m^3$

④ (w/c) ← 4.1 جدول رقم

$F_{cu} = 43 \ @ \ (w/c) = 0.5$

$F_{cu} = 52 \rightarrow (w/c) = 0.44$ ← 4.1 جدول رقم

$(w/c) = 0.44 < (w/c)_{max} = 0.5$ ok

② w_c

$w_c = \frac{w_w}{(w/c)} = \frac{160}{0.44} = 363\ kg/m^3$

$(w_c) > (w_c)_{max}$ ← used $\boxed{w_c = 300\ kg/m^3}$

بعد التعديل $(w/c) = \frac{w_w}{w_c} = \frac{160}{300} = 0.533 > (w/c)_{max}$

∴ $(w/c) = (w/c)_{max} = 0.5$ لاستيعاب الإضافات

⑤ w_{Agg} · $w_{Concrete} = 2450\ kg/m^3$ ← 4.3 جدول رقم

∴ $w_{Agg} = 2450 - 300 - 160 = 1990\ kg/m^3$

$R = \frac{30+38}{2}$ ، نسبة الرمل

$R = 34\%$

$\therefore W_{fine} = W_{Agg} * R$

$= 1990 * \frac{34}{100} = 677 \ kg/m^3$

$W_{Agg} = W_{fine} + W_{Coars} \Longrightarrow W_{Coars} = 1313 \ kg/m$

W_w	W_c	(W/C)	W_{fine}	W_{Coarse}
160 kg/m^3	300 kg/m^3	0.55 + اضافات	677 kg/m^3	1313 kg/m^3
V_w	V_c	~~V~~	V_{fine}	V_{Coarse}
0.16 m^3/m^3	0.095 m^3/m^3	—	0.43 m^3/m^3	0.82 m^3/m^3

$V_{Coarse} = \frac{1313}{1600} = 0.82 \ m^3/m^3$

$V_{fine} = \frac{677}{1550} = 0.43 \ m^3/m^3$

$V_c = \frac{300}{3150} = 0.095 \ m^3/m^3$

$V_w = \frac{160}{1000} = 0.16 \ m^3/m^3$

$/m^3$ ← للمتر

معناها انك لو عاوز تعمل ٣م من الخرسانة فمحتاج الكميه دي

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Faculty of Engineering at Mataria Department: Civil Engineering Course Name: Characteristics & Strength of Materials (2) Course Code: (٤٢١٣٥) Level: Second year civil	HELWAN UNIVERSTY	1st / 2nd Semester Academic Year 2014/2015 Exam Type (Mid/Term): Assignment No. 1- Fresh concrete and mix design of NC mixes Date of Exam (Assi.): 18/11/2014 Time Allowed: To be submitted on Sunday 30/11/2014 Maximum Mark: 10 degrees

NOTE: Delay in submission will result in cancellation of degrees

Q1	Idea (50)%	Steps (40)%	Calculations (--)%	Final Result (10)%	Mark (10)

Draw the following with net sketches:

1- Factors affecting the performance of concrete.
2- A schematic diagram showing the contents of cement paste, cement mortar, and concrete.
3- The effect of water content on the density of concrete mixes, based on the conditions of dry surface – saturated concrete, taking into account the effect of the relative density of aggregate.
4- A schematic diagram showing the advantages and disadvantages of concrete.
5- A Table showing the different groups and grades of concrete.
6- A schematic diagram presenting the different classifications of concrete those related- to proportioning and characteristics of concrete.
7- A schematic diagram showing the supplementary cementing materials those may be added to concrete mixtures.
8- A schematic diagram showing the chemical admixtures those may be added to concrete.
9- The expected slump type of mix that will be cast by pumping technique.
10- A schematic diagram showing the different performance requirements of concrete.
11- The expected slump type of mix with poor cement content.
12- A schematic diagram indicating the factors affecting workability of concrete.
13- Diagram showing how the parameters defining workability affects the rheology of concrete.
14- The effect of coarse aggregate content in concrete mix on the workability of concrete.
15- The average relationship between the w/c and the compressive strength of concrete.
16- The effect of aggregate shape and texture on the workability of concrete.
17- Effect of water content and aggregate size on the workability of concrete.
18- The effect of time on the workability of concrete.
19- A schematic diagram showing the different criteria of concrete. Point out which category relates to fresh concrete and which one relates to hardened concrete. → short, long
20- The types of slump.
21- The expected slump type of mix having medium plastic consistency.
22- The relationship between slump and compacting factor for mixes with different aggregate- cement- ratio.
23- The different types of set of cement, mortar, and concrete.
24- The relationship between slump and Vee-bee time.
25- A schematic diagram showing the basic constituent materials of normal concrete.
26- The relationship between the slump and the value of the penetration of the Kelley ball.
27- The expected relationship between the maximum aggregate size and the water content of concrete mixes taking into account the effect of the type of aggregate.
28- The expected relationship between slump and the water content of concrete mixes taking into account the effect of the maximum aggregate size and the type of aggregate.
29- A schematic diagram showing the role of the workability performance requirements on achieving the rheology of concrete.
30- A schematic diagram showing the parameters defining the rheology of fresh concrete.
31- A schematic diagram of Bingham model expressing the rheology of concrete.
32- A schematic diagram showing the steps of the modified slump test to define the two parameters defining the rheology of concrete.

(13)

33- The details of the sliding top plate of the modified slump test showing the details of the O-ring in the plate.
34- A comparison between the values of slump and modified slump.
35- The process of setting and hardening of concrete marking the different stages on the drawing.

Q2	Idea (35)%	Steps (30)%	Calculations (20)%	Final Result (15)%	Mark (10)

Make a complete mix design given the following parameters:

f_{cu} (MPa)	Slump (mm)	Cement Type	Agg. Type	Max. Agg. Size (mm)	Zone of fine Agg.	Max. W/C	Max. Cement content (kg/m^3)	Min. Cement content kg/m^3)
30	60-100	OPC	Crcrushed	40	2	0.55	350	250
40	10-30	SRPC	Uncrushed	20	2	0.5	300	250
60	30-60	OPC	Crushed	10	1	0.48	400	300

Try all parameters, properties of the constituent materials, and the available reference data to reach a complete design and to get the final mix proportions. Show in a table the required proportions for trial mix of volume 0.01 m^3 for each mix. Express the proportions by weight and volume, given that:
The unit weight of coarse aggregate = 1600 kg/cm^3
The unit weight of fine aggregate = 1550 kg/cm^3
The specific weight of aggregate = 2.65
The specific weight of cement = 3.15

Q3	Idea (--)%	Steps (--)%	Calculations (--)%	Final Result (100)%	Mark (10)

Mark the right choice a, b, c, or d that makes the following statements correct

1- Chemical admixtures are a. types of aggregate b. cement paste ● ingredients in concrete other than aggregate, cement, and water d. non of these choices
2- Mortar in concrete work as ● a part of the concrete mix b. lubricant c. hardened concrete d. a mix of cement and water
3- Silica fume and fly ash are ●. concrete admixture b. chemical admixture c. by-products of concrete industry d. retarders
4- Supplementary cementing materials are characterized by ● their pozzolanic activity b. self-active nature c. high strength d. alkali reactivity
5- Retarders ●. reduce setting time b. reduce workability c. increase setting time d. increase workability
6- Classification of concrete that specifying the proportions of constituents and their characteristics is termed a. elastic proportioning b. desirable properties c. none of these choices ●. prescriptive specifications
7- The concrete of grade M25 is ●. standard concrete b. high strength concrete (HSC) c. lean concrete d. ordinary concrete
8- The lake of ductility of concrete can be improved by a. adding supplementary cementing materials b. using reinforcing steel in the tension side c. adding plasticizers ●. both choices a, c are correct
9- Consistency is related to a. workability b. flowability c. rheology ●. choices a, b, and c together
10- Strength and durability are a. properties of concrete ●. long- term requirements of concrete c. very important when mixing concrete b. properties of fresh concretec.
11- Ease is a- the relative mobility of a freshly mixed concrete b- the stability of concrete c- the workability of concrete ●- related to rheology of fresh concrete
12- Uniform and stable distribution of concrete ingredients and the resistance to segregation means ●-homogeneity b- uniformity c- consistency d- nothing
13- Rheology and workability are related to each other by the means of two properties, a- ease and stability b- consistency and homogeneity ● choices a, and b d- viscosity and yield stress
14- Workable concrete should contain a- well graded aggregate. b- reasonable aggregate-to- cement ratio c- water content suitable for the aggregate size, cement content and type, and aggregate type ●- choices a, b, and c

(14)

15- There must be enough water in concrete mixes to: a- hydration process only ●- choices c and d b- adsorb on the particle surface d- fill the spaces between particles

16- Coarse aggregate affects workability significantly more than a- water b- cement c- admixtures ●- none of these choices

17- Admixtures those affect concrete workability directly are a- air entraining b- boron addition c- supplementary cementing materials ●- superplasticisers

18- concrete sets a- rapidly b- very slowly ●- on two stages like cement d- after 24 hours

19- C3S and Gypsum help together in ~~a- controlling setting time b- reducing the setting~~ time c- controlling the role of C3A d- nothing

20- False set a- is a plaster set b- is a flash set ●- is abnormal set in which the workability of concrete can be regained by remixing d- choices a and c

BEST WISHES
Prof/Tarek Aly Elsayed
Dr. Wael Refaat

التسليم النهائى يوم 30

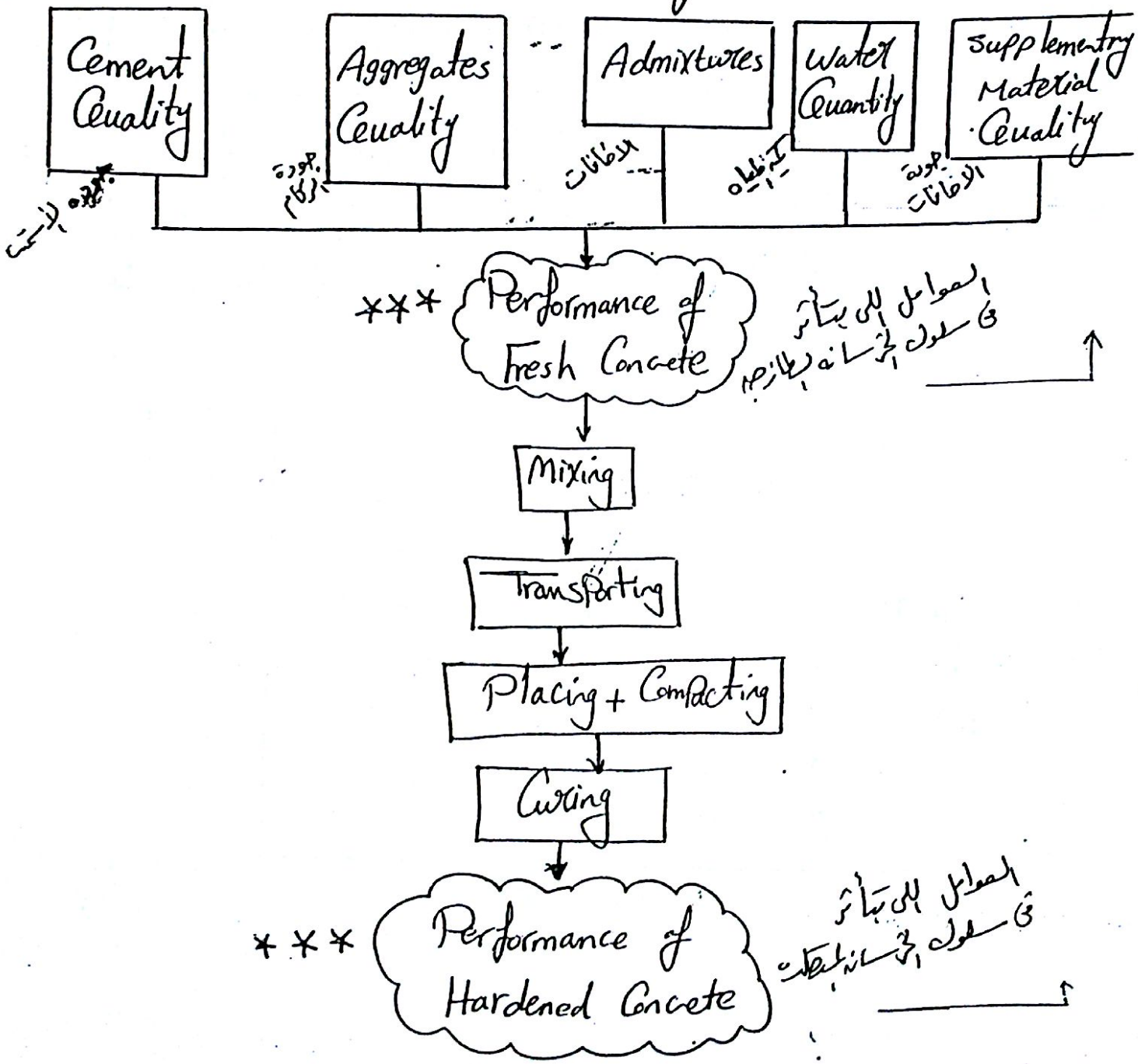
(15)

الشيت المطلوب مراجعته

Draw the following with net sketches

لازم ارسم بالقلم الرصاص وبخط يده

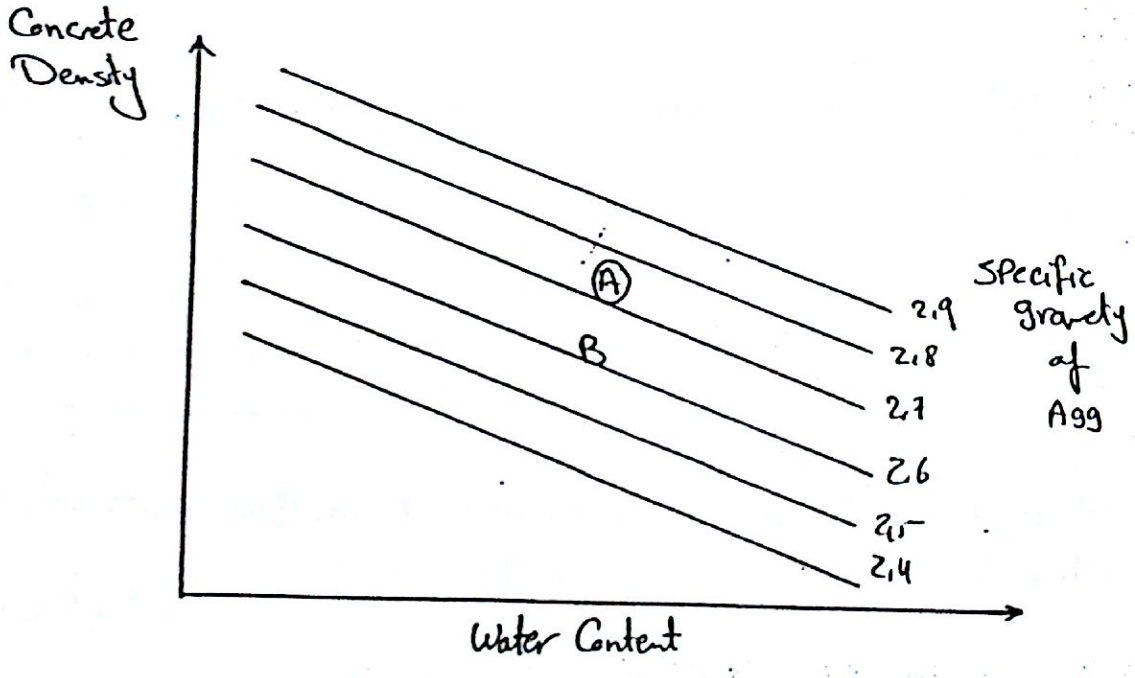
1 Factor affecting the Performance of Concrete.



- A schematic diagram showing the Content of Cement Paste, Cement mortar and Concrete.

Concrete	Filler + Binder
Paste	Cement + Water
Mortar	Fine Agg + Paste

3- The effect of water Content on the density of Concrete mixes based on the Conditions of dry surface saturated Concrete Taking into account the effect of relative density of Agg.



- A schematic diagram showing the Advantages and disadvantages of Concrete.

Advantages	Disadvantages
* Economical	* low tensile strength
* Ability to be Cast	* low Ductility
* Durable	* Volume instability
* Fire resistant	* low strength to weight ratio
* Energy efficient	
* on site fabrication	

5- A Table of showing the different Graups and Grades of Con.

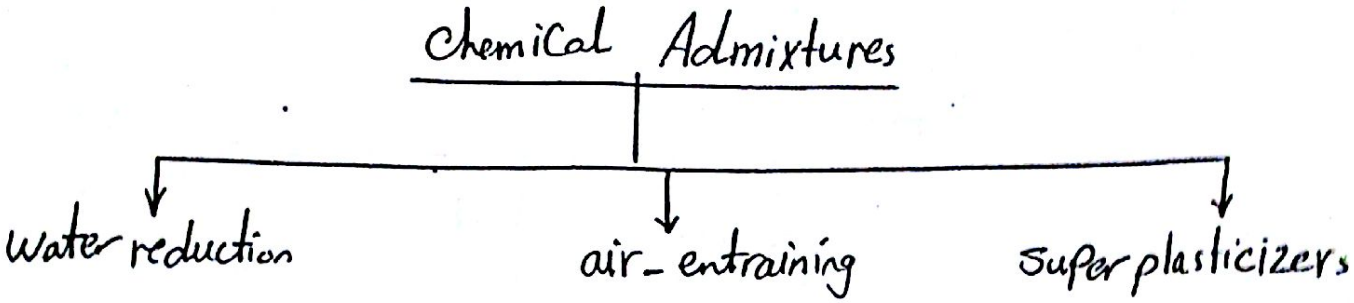
Graup	ordinary Con.	Standard Con.	High strength Con.
Grade design	M10 → M20	M25 → M55	M60 → M80
Compressive strength Fcu	10 → 20 MPa (N/mm²)	25 → 55 MPa (N/mm²)	60 → 80 MPa (N/mm²)

6- Aschemtic diagram Presending the different classification of Concrete those related to Proportining and characterisitics of Concrete

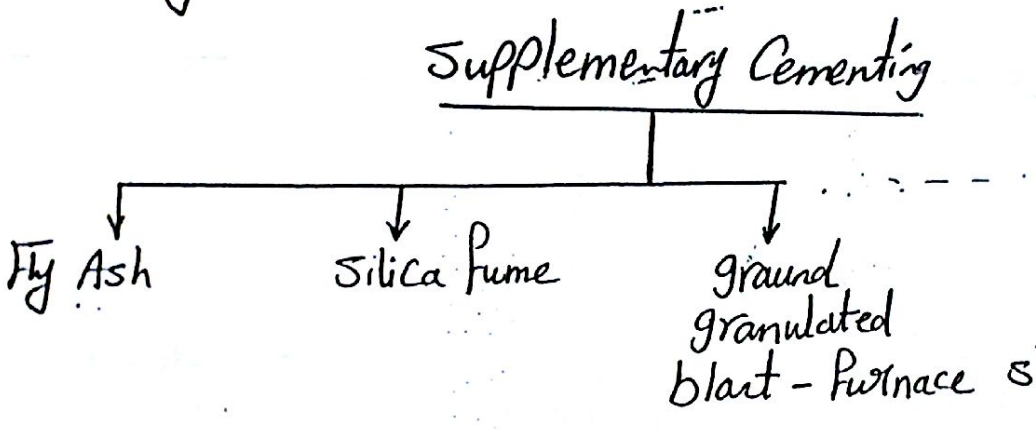
(A) Prescriptive specification (Strength - Workability)

(B) Performance - oriented Specification (normal Concrete - designed

8- A schematic diagram showing the chemical admixtures those may be added to Concrete.



7- A schematic diagram showing the supplementary cementing materials those may be added to Concrete.



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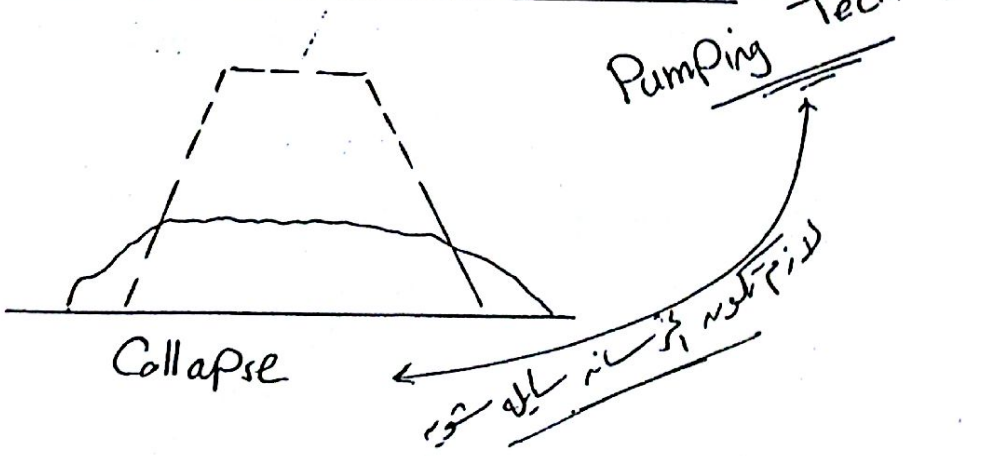

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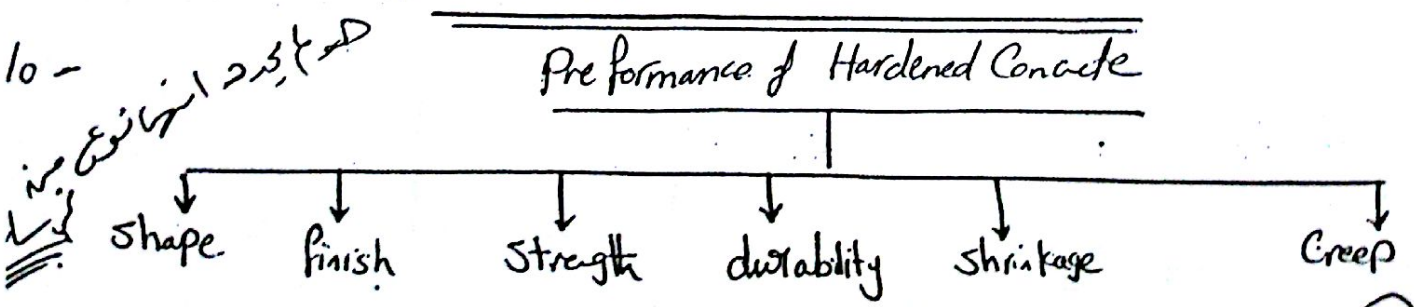
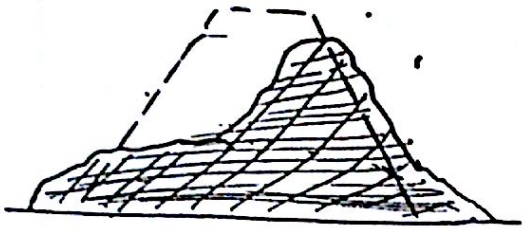




Shear Slump

12-

Factors Influencing Workability

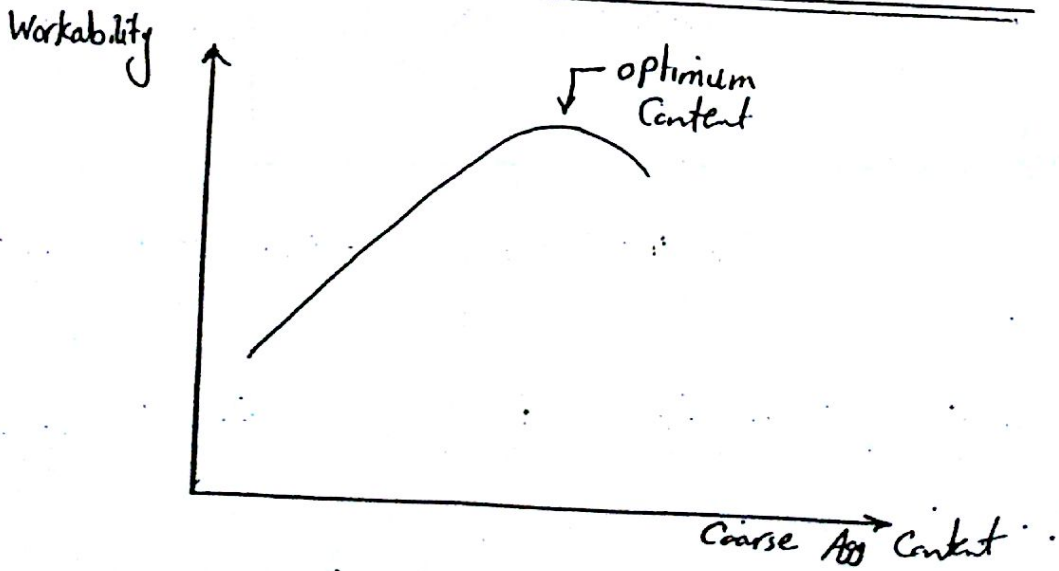
- Mix Proportions
- Properties of Constituent Material
  - Water
  - Agg
  - Cement
  - Admix
- Environmental Conditions
  - Temp.
  - Humidity
  - wind
- Time

13-

Rheology

- Stability
  - Segregation
  - Bleeding
- Compactability
  - Relative density
- Mobility
  - Viscosity
  - Cohesion
  - Friction

14-



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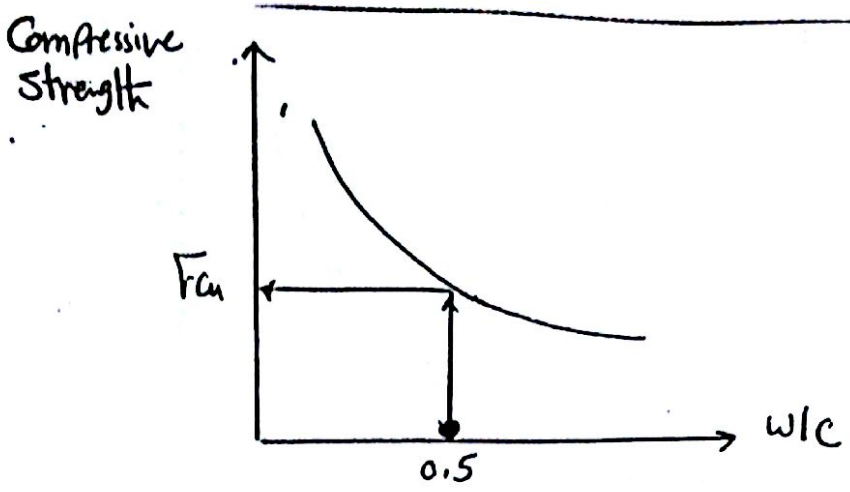

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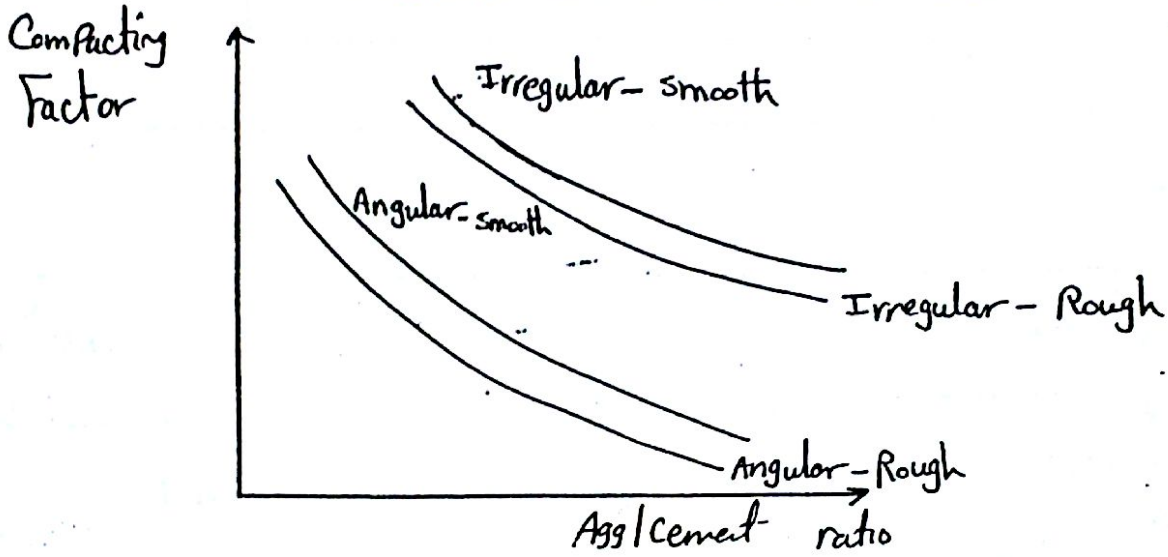

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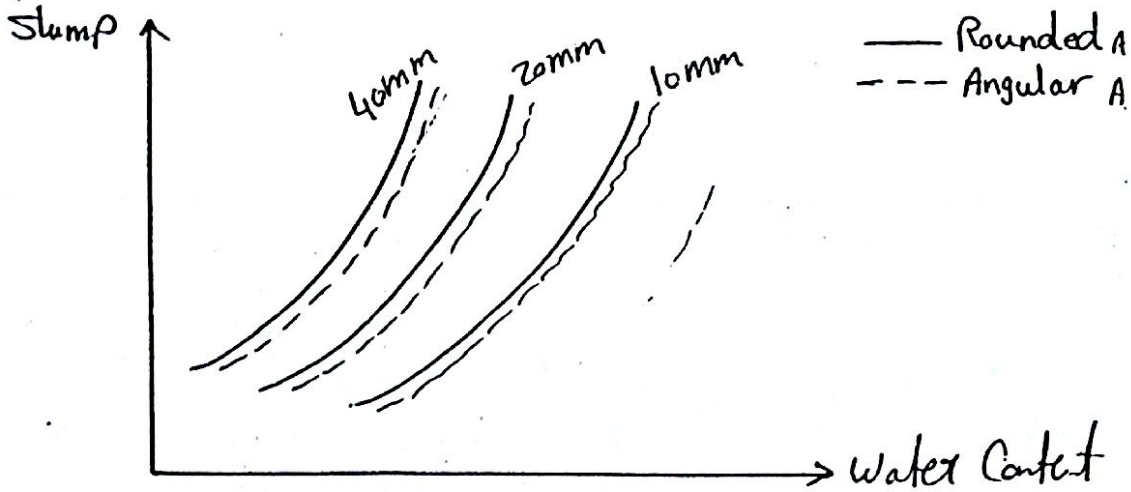

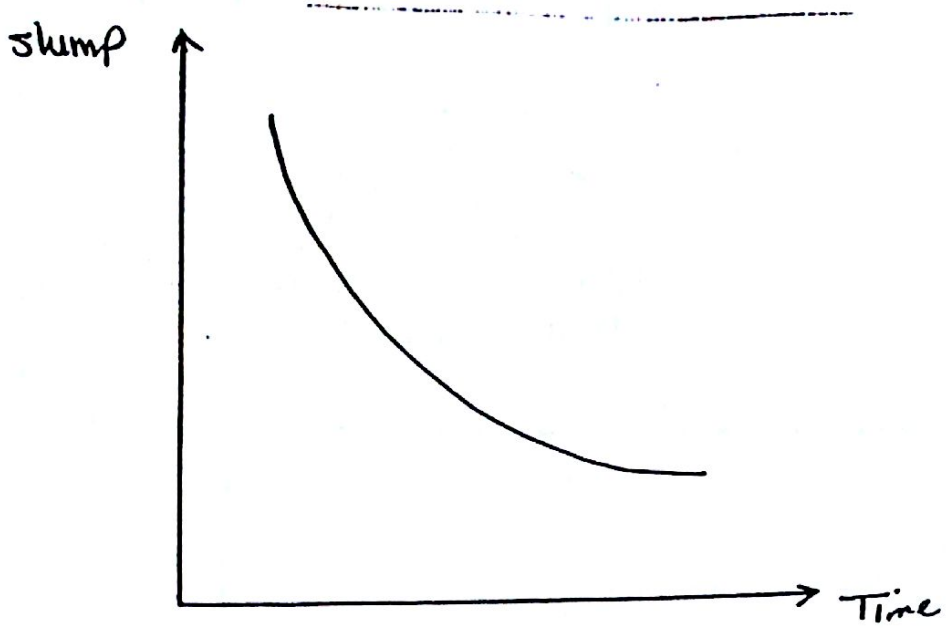

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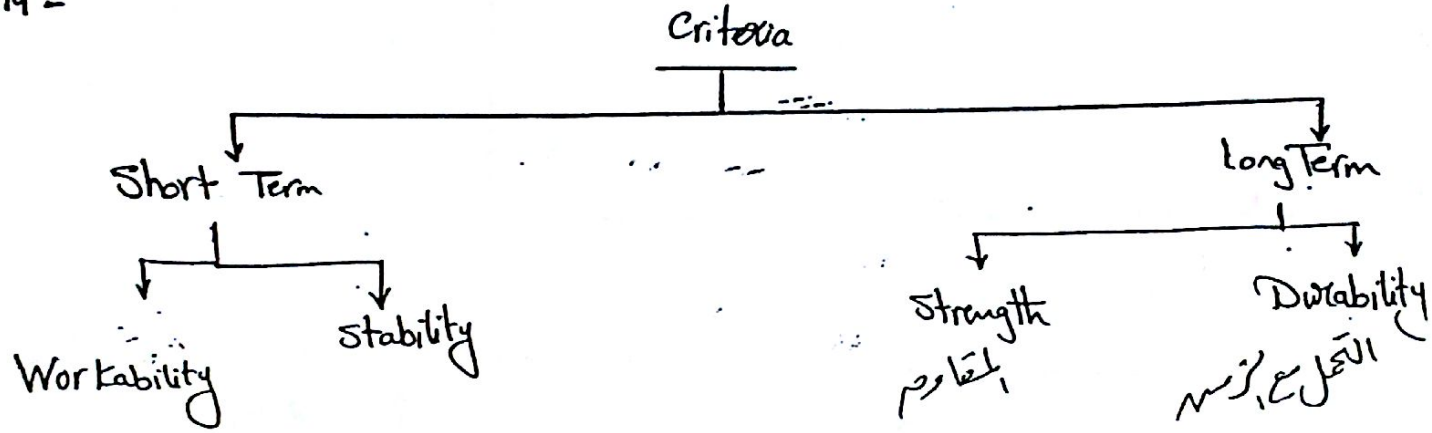

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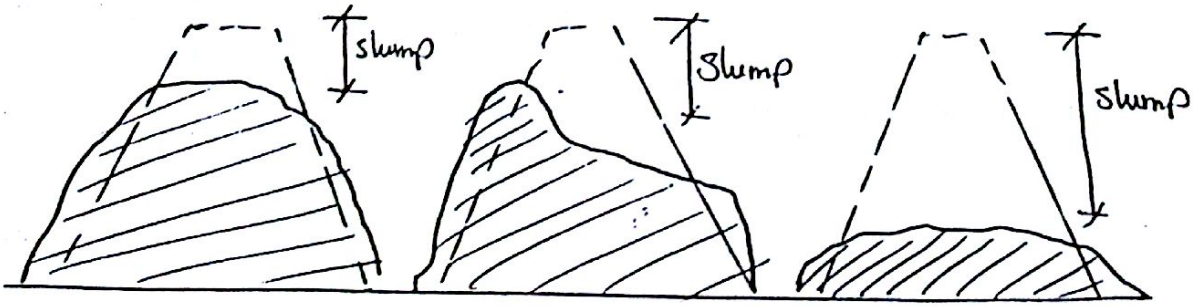


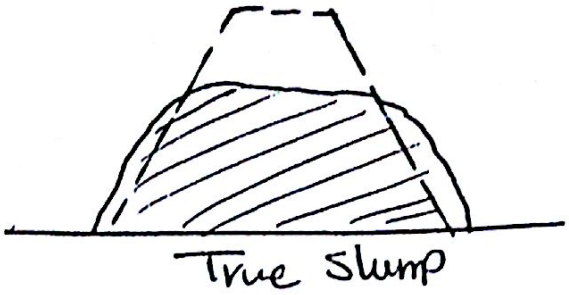
True Slump

Plastic Concrete

Shear slump

Collapse slump

1-



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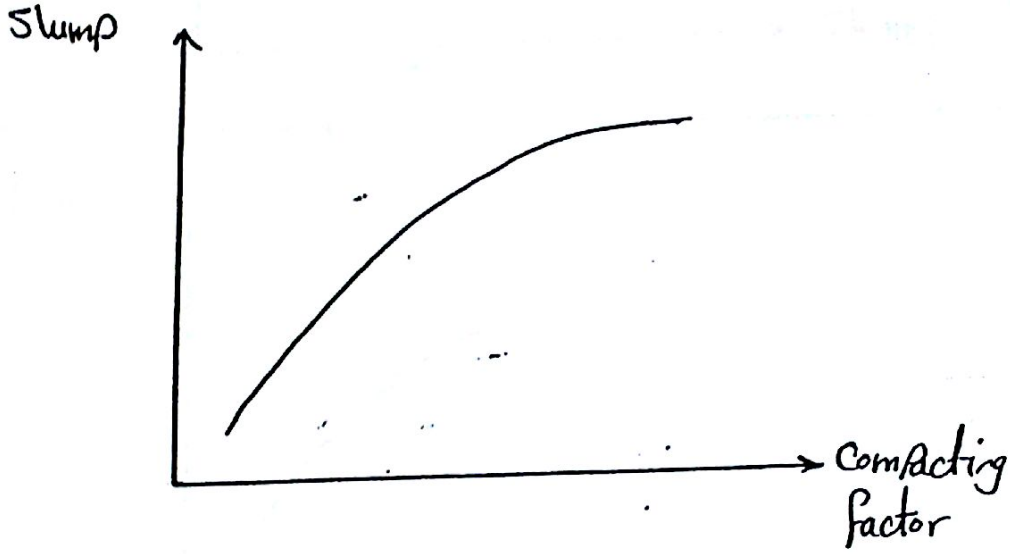

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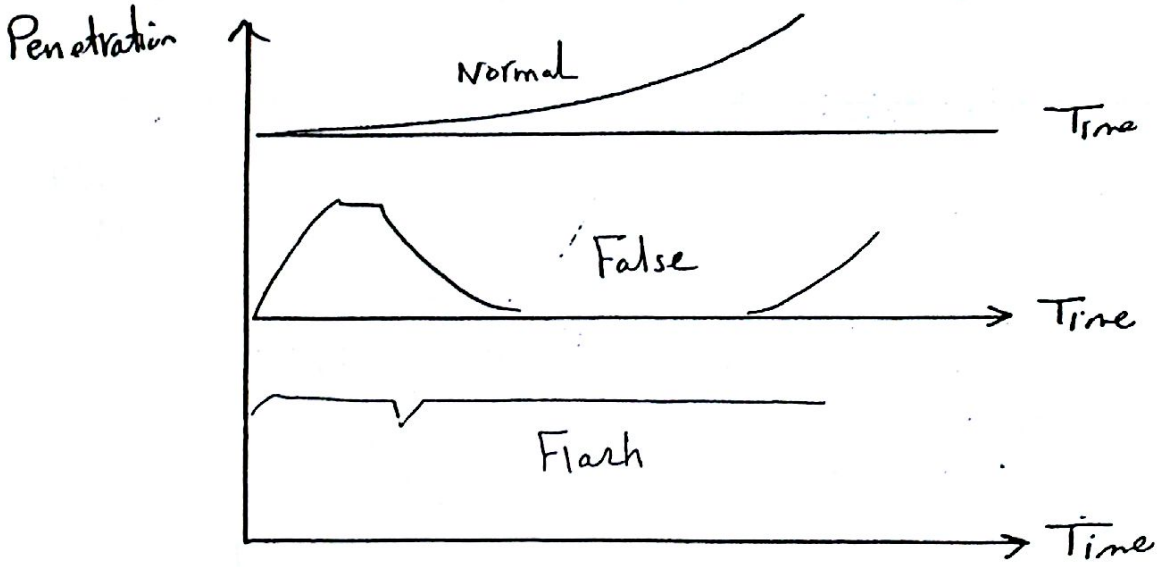

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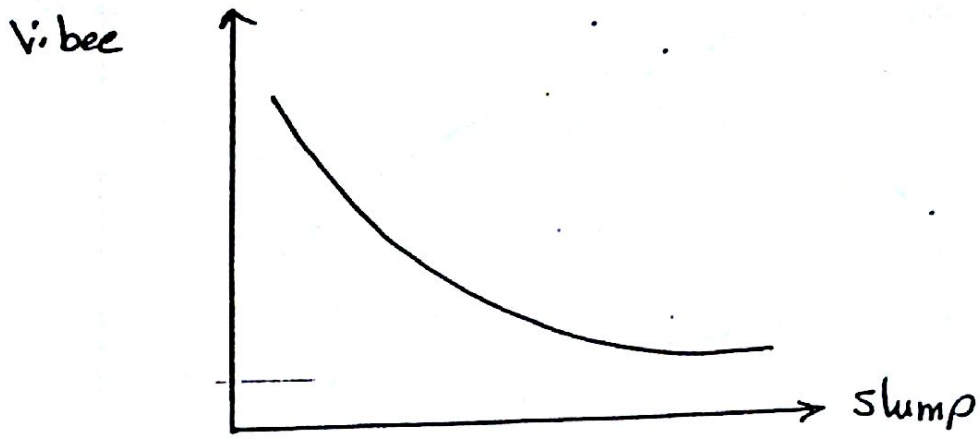

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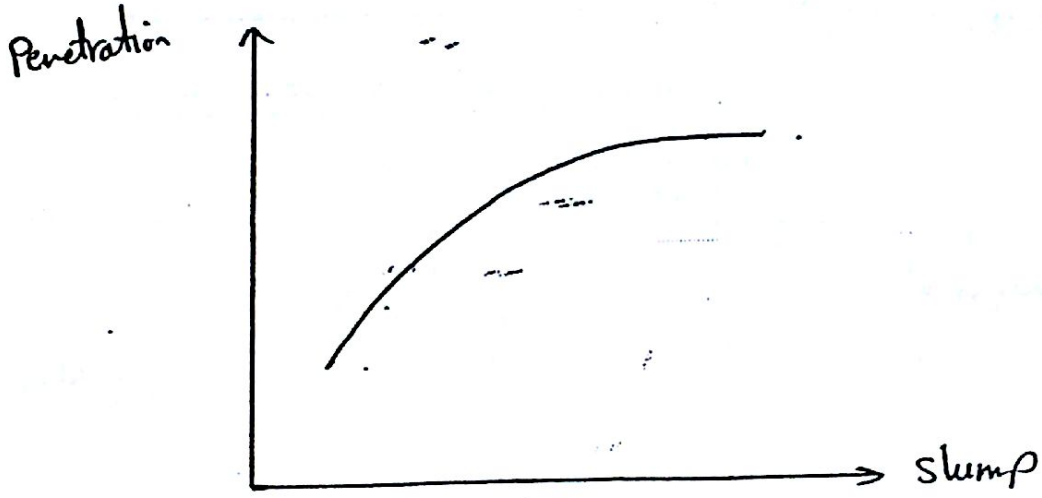

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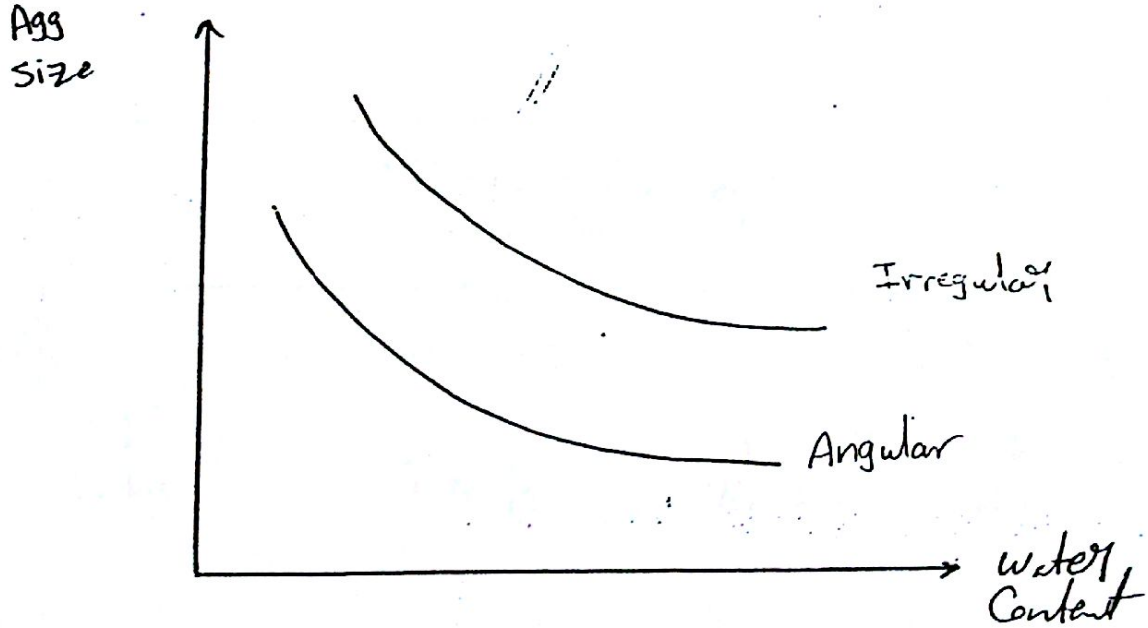

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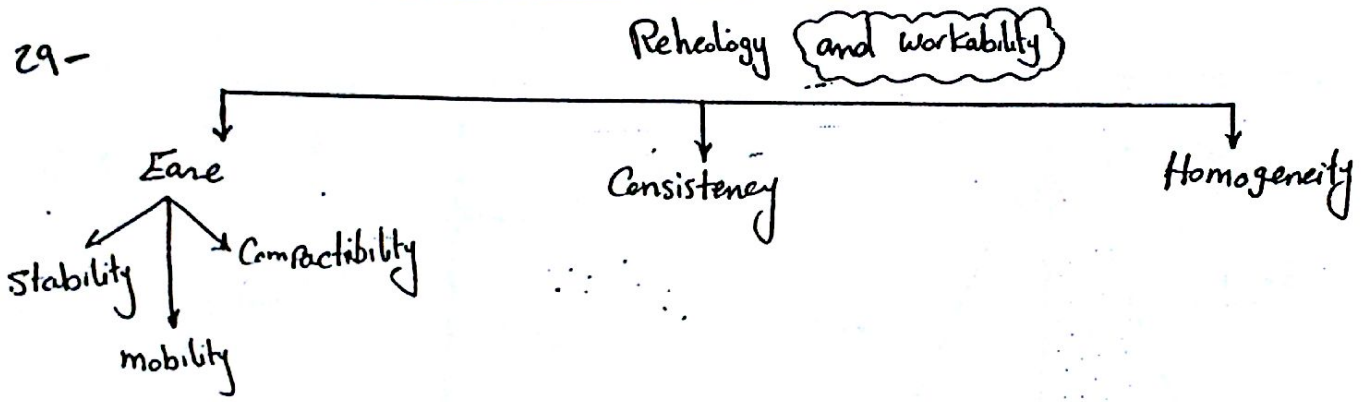

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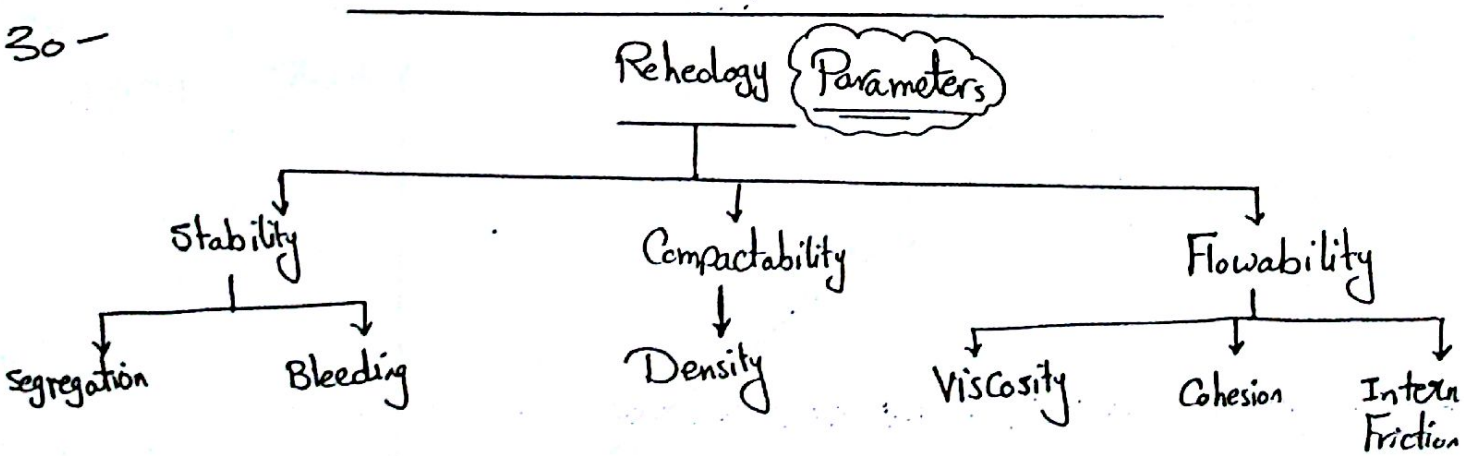

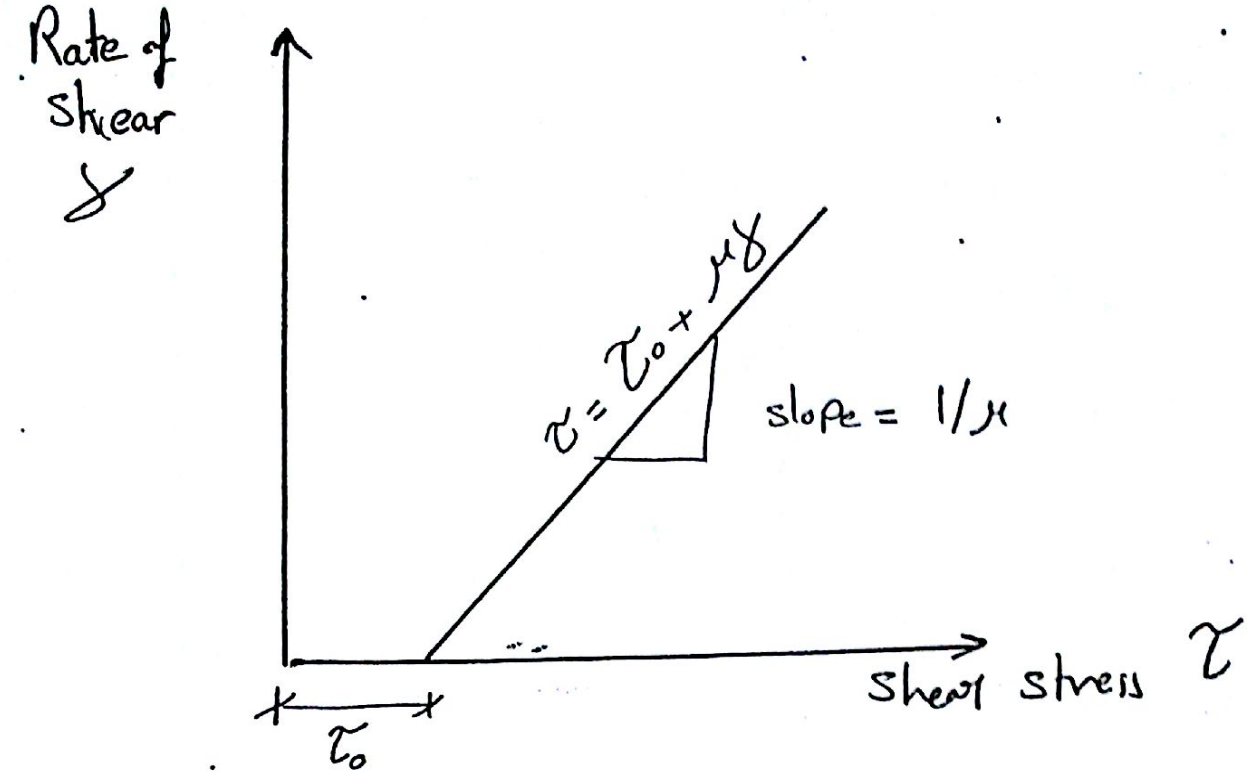

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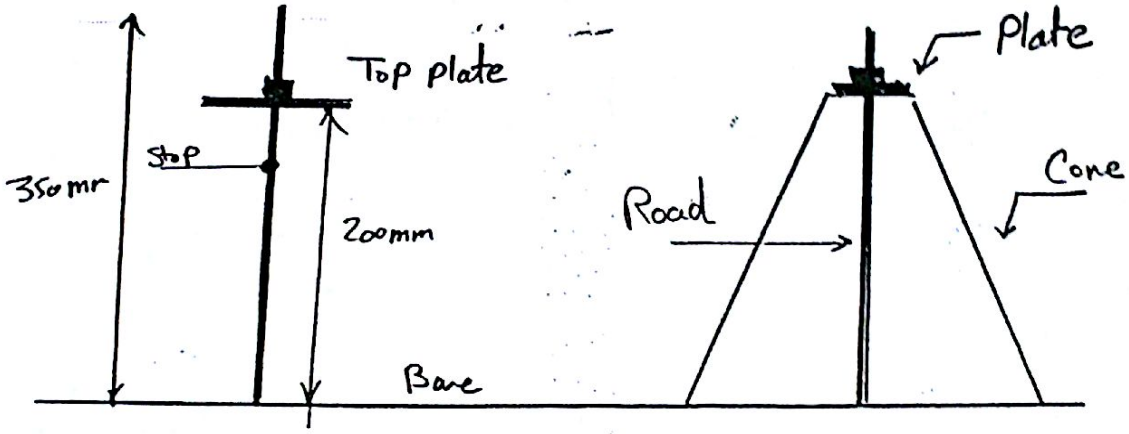
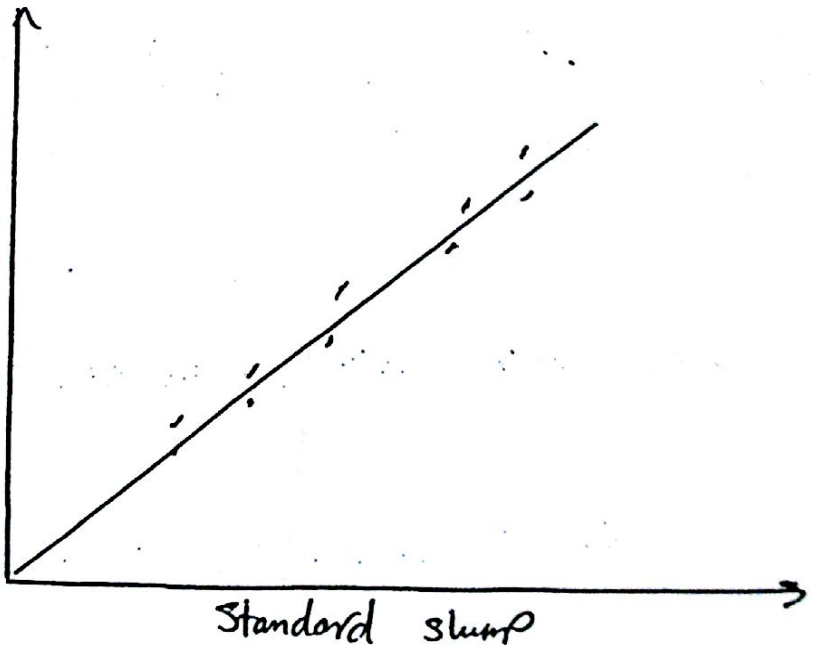
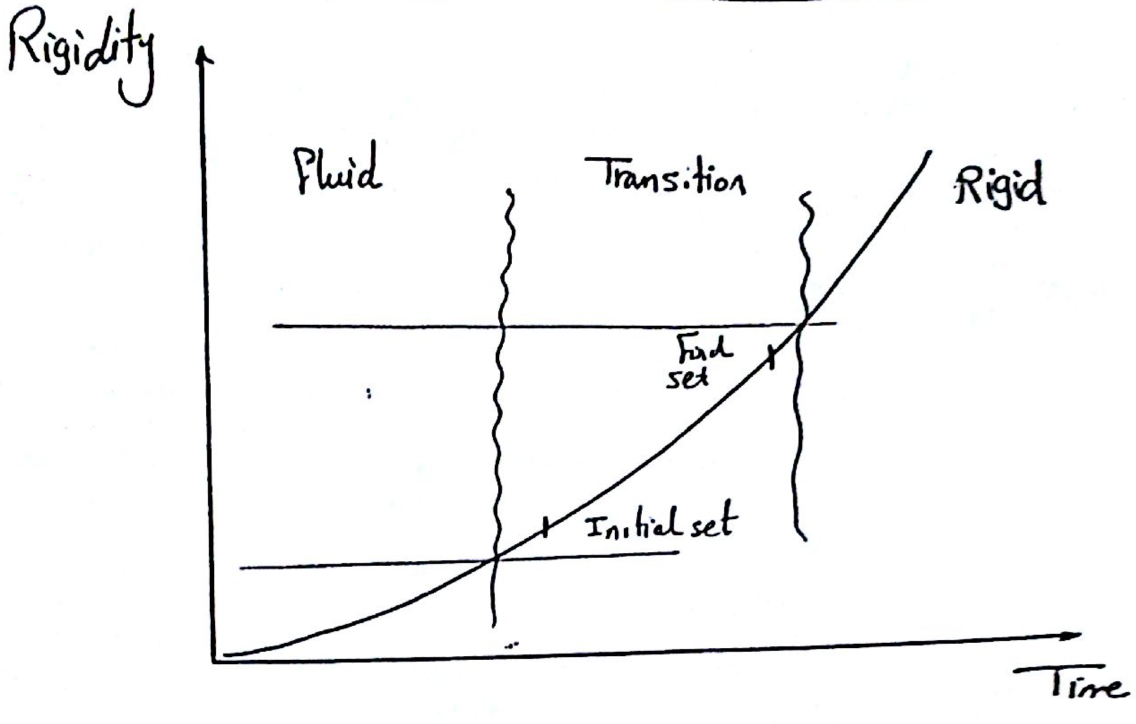


34 Modified Slump





الرسومات احفظها زي اسمك

مهم

أقرأ السؤال تلات مرات هتبقا عارف كل سؤال
ومش عارف بتاعت آنهي سؤال

Helwan University		1st √	**Semester**
Faculty of Engineering at Mataria		2nd	**Academic Year 2013/2014**
Course Name:(Chac. & test of materials2)		**Time Allowed:** (1:30) Hours	
Course Code: (CV4213)		**Level:** (2nd year)	
Date of Exam: 23-11-2013		**Department:** (Civil Engineering)	

Note: Exam questions are in one page

Q1	Idea (50)%	Steps (40)%	Calculations (-)%	Final Result (10)%	Mark (20)

Draw the following with net sketches **(free hand drawings and drawings without Pencil will not be evaluated)**

1. Diagram showing the factors influencing workability of concrete.
2. Influence of aggregate content on the workability of concrete.
3. Types of relative movement of the two crack surfaces.
4. Effect of aggregate shape, and texture on the workability of concrete.
5. Effect of placing time on concrete workability.
6. The three main types of slump.
7. Relationship between slump and Vee-bee time.
8. Relation between slump and the value of the penetration of the Kelley ball.
9. The flow table test apparatus.
10. The relation between the w/c and the compressive strength of concrete.

Q2	Idea (50)%	Steps (25)%	Calculations (15)%	Final Result (10)%	Mark (20)

A 10 mm crack was detected at 3m from the left support of a 6m simply supported beam loaded by 2 t/m uniform load. Check the stability of the beam against fracture failure if the beam cross – section is 10 x 40 cm and the critical toughness of the beam material is 200 kg/ cm^3/2. Take F(a) = 1.05

Q3	Idea (-)%	Steps (-)%	Calculations (-)%	Final Result (100)%	Mark (20)

Choose the correct choice that makes the following statements correct. The choice is correctly made by filling the circle in front of the correct choice same as that●, otherwise choice will not be evaluated.

1) Chemical admixtures are ○ types of Portland cement ○ mix of fine and coarse aggregate ● ingredients in concrete other than aggregate, cement, and water ○ limestone powder
2) Concrete constituent materials are ○ lime, cement, aggregate, and water ○ cement, aggregate, and water ○ cement, fine aggregate, and water ● cement, fine aggregate, coarse aggregate, and water
3) Mortar is ● a part of the concrete mix ○ hardened cement paste ○ hardened concrete ○ a mix of cement and water
4) Supplementary cementing materials are characterized by ● their pozzolanic activity ○ white color ○ high permeability ○ alkali reactivity
5) Classification of concrete that specifying the proportions of constituents and their characteristics is termed ○ static proportioning ○ desirable properties ○ non of these choices ● prescriptive specifications
6) One of the advantages of concrete is ● the high fire resistance compared to other construction materials ○ its high tensile strength ○ its high ductility ○ its high density
7) One of the disadvantages of concrete is ○ its mobility ○ its rheology ○ its low abrasion resistance ● its low strength-to-weight ratio
8) The performance requirements of hardened concrete are more or less well defined with respect to ○ rheology only ○ consistency ● *shape, finish strength, durability, shrinkage* and *creep* ○ homogeneity
9) To achieve good performance hardened concrete, fresh concrete should be ○ stable ○ cohesive and sufficiently mobile ○ amenable, dense, and able to be compacted with minimum voids under the existing facilities of compaction at the site ● all of the other three choices together
10) Ease is related to ○ yield stress of concrete ○ viscosity ● stability ○ rheology

Q4	Idea (50)%	Steps (25)%	Calculations (15)%	Final Result (10)%	Mark (20)

Make a complete design for the following mix

f_{cu} (MPa)	Slump (mm)	Cement Type	Agg. Type	Max. Agg. Size (mm)	Zone of fine Agg.	Max. W/C	Max. Cement content (kg/m^3)	Min. Cement content (kg/m^3)
25	30-60	OPC	Crushed	20	2	0.50	350	250

With our best wishes
Prof. Tarek Aly Elsayed
Ass. Prof. Wael Refaat

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Mid Term 2013 - 2014

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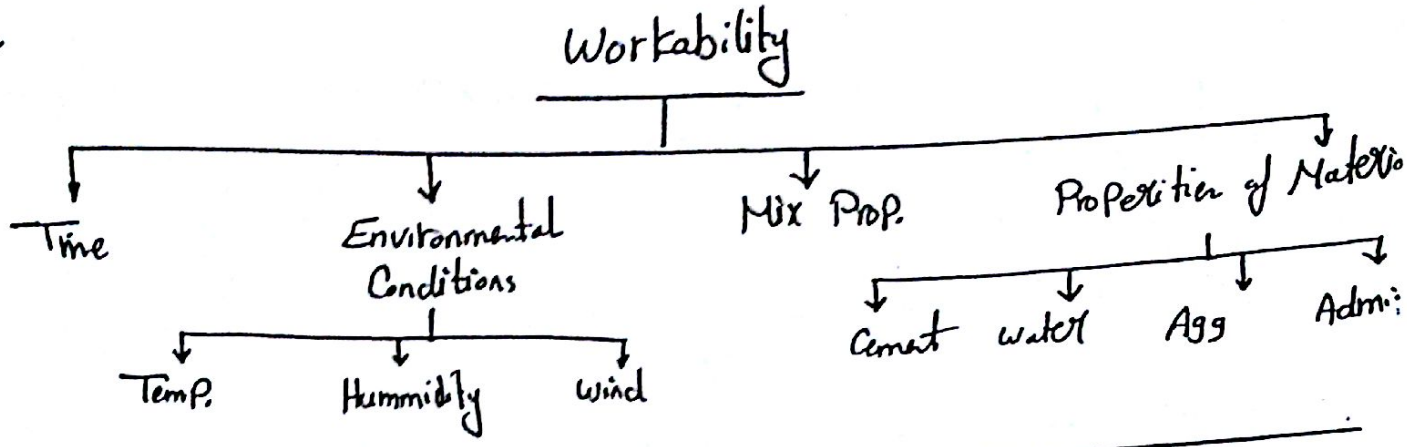

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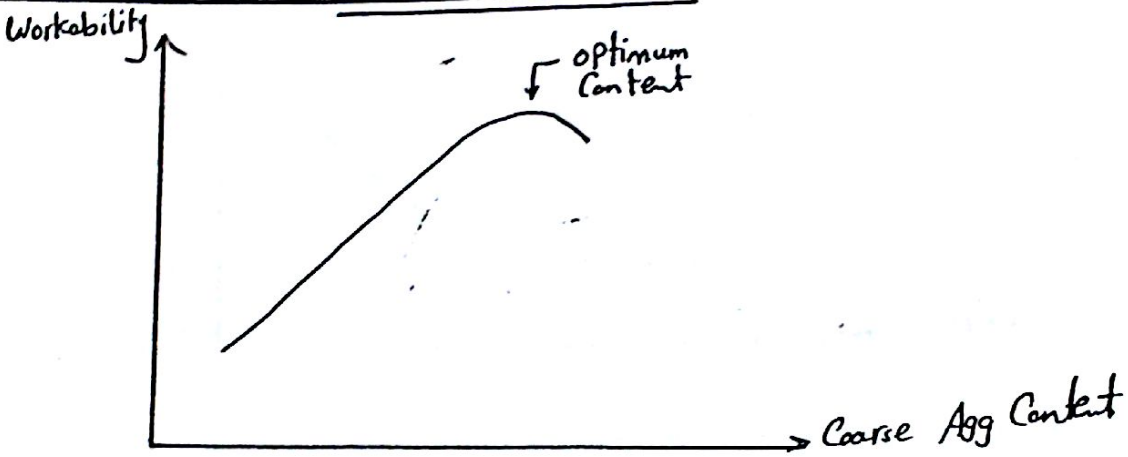

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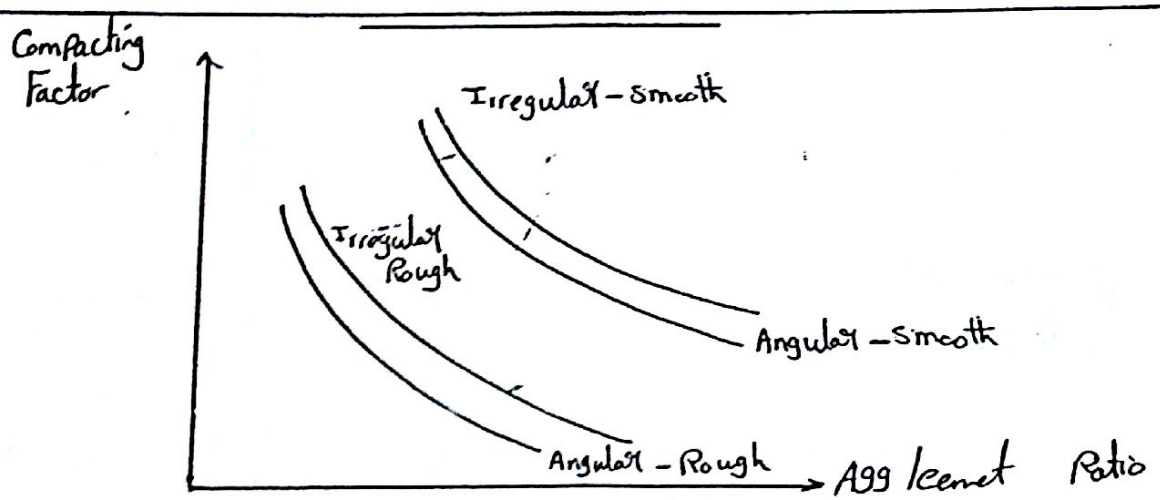

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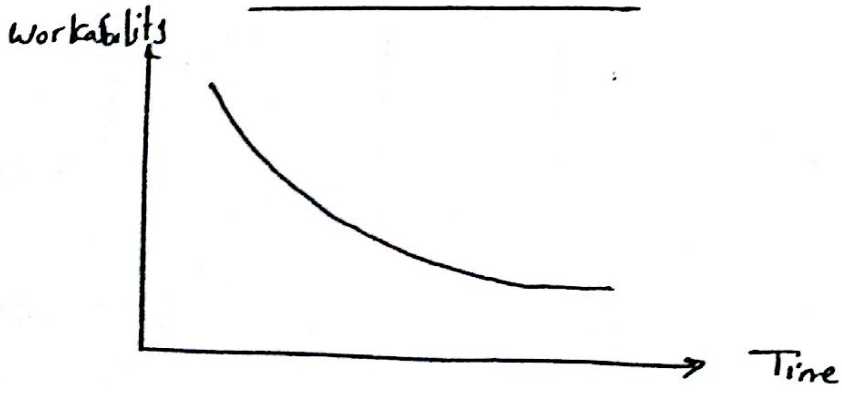

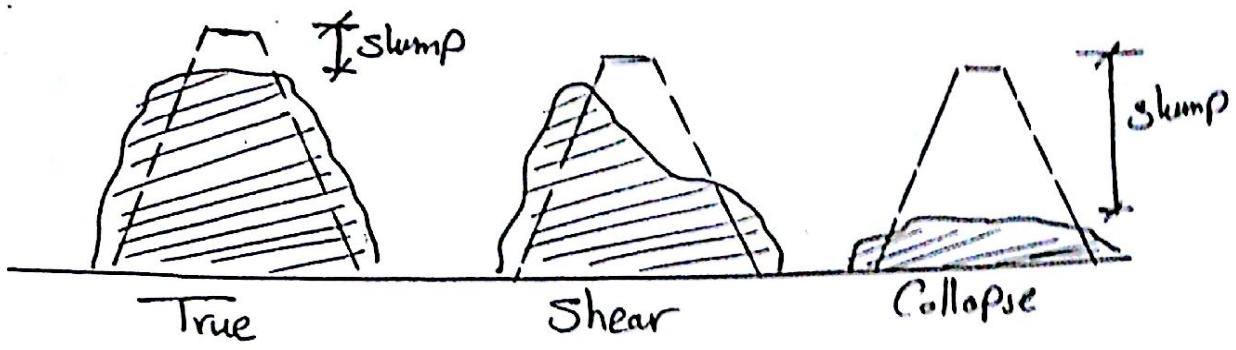

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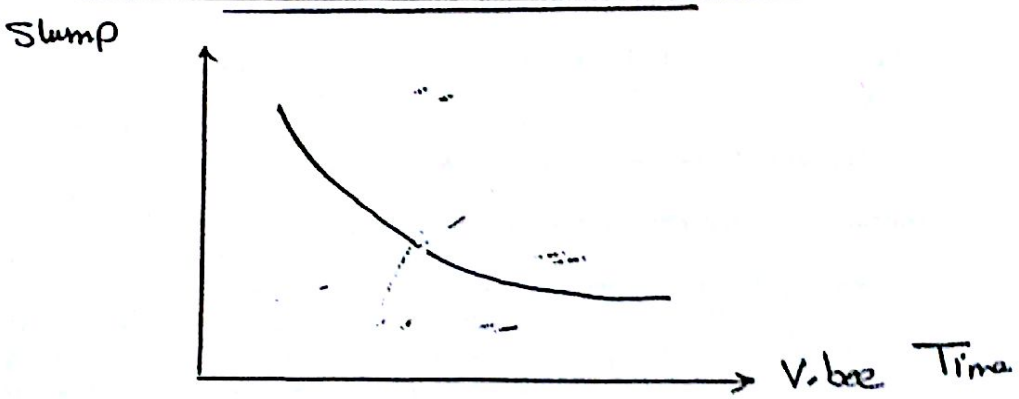

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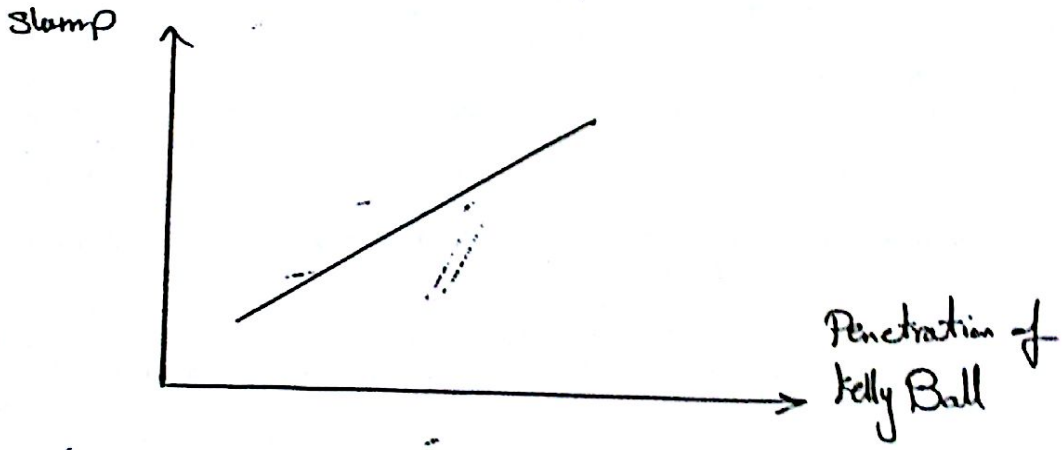

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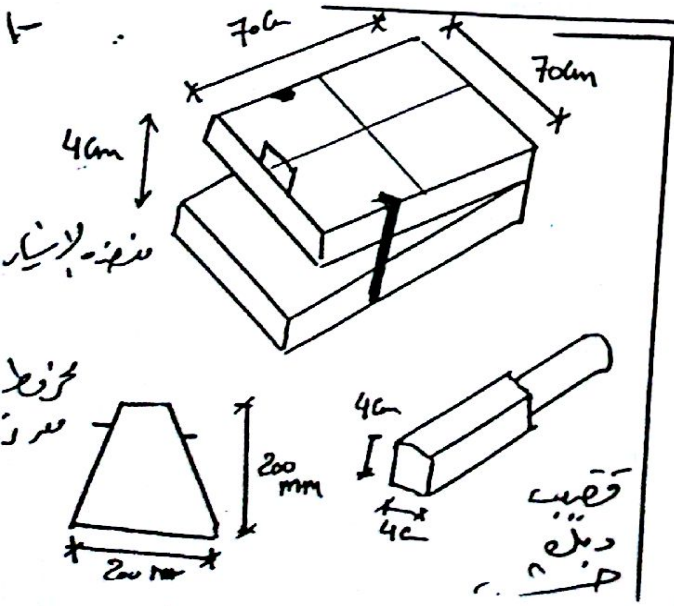

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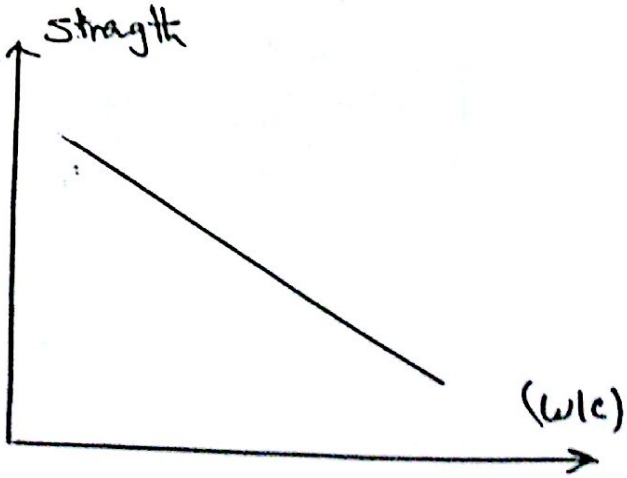


1.8 Problems

1. Draw the following with net sketches:

a. Factors affecting performance of concrete.
b. A diagrammatic sketch showing the contents of concrete, mortar, and cement paste.

2. Make a comparison between normal mixes concrete and designed mixes concrete.

3. Mark the right choice a, b, c, or d that makes the following statements correct.

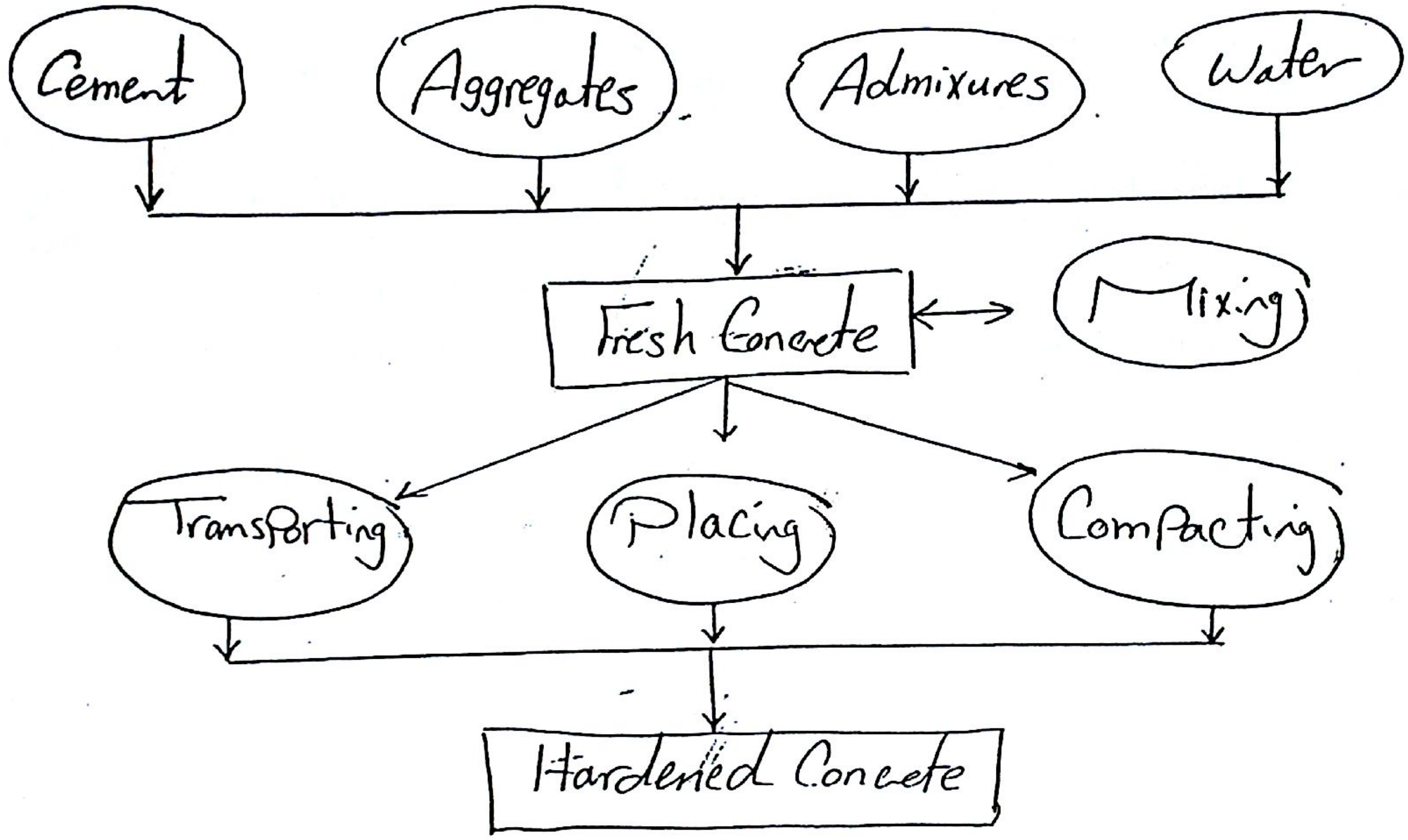
- Chemical admixtures are a. types of Portland cement b. mix of fine and coarse aggregate c. ingredients in concrete other than aggregate, cement, and water d. limestone powder
- Concrete consists of a. cement and aggregate b. cement paste and aggregate c. filler and binder d. cement and water
- Mortar is a. a part of the concrete mix b. hardened cement paste c. hardened concrete d. a mix of cement and water
- Silica fume and fly ash are a. concrete constituent materials b. Supplementary cementing materials c. by-products of concrete industry d. retarders
- Supplementary cementing materials are characterized by a. their pozzolanic activity b. white color c. high permeability d. alkali reactivity
- Retarders are a. concrete constituent materials b. mineral admixtures c. limestone powder d. chemical admixtures
- Classification of concrete that specifying the proportions of constituents and their characteristics is termed a. static proportioning b. desirable properties c. strength and workability d. prescriptive specifications
- The concrete of grades M5 and M7.5 is suitable for a. highway pavement b. high strength concrete (HSC) c. lean concrete bases d. none of these choices is correct
- one of the advantages of concrete is a. its high tensile strength b. the high fire resistance compared to other construction materials c. its grey color d. its high cement content
- The lake of ductility of concrete can be improved by a. adding chemical admixtures to concrete mixes b. reinforcing concrete structural elements by reinforcing steel at the tension side c. adding fibers to concrete mixes d. both choices b, c are correct
- Workability is a. a long-term requirements of concrete b. a property of hardened concrete c. a short-term requirement of concrete d. better to be very high for all concrete mixes
- Strength and durability are a. properties of hardened concrete b. properties of fresh concrete c. very important when mixing concrete d. coarse aggregate

Sheet 1 Chapter 1

Draw The following with net sketches :-

لازم ارسم بالقلم رصاص و بمسطره

a] Factors affecting Performance of Concrete



b] A diagrammatic sketch showing The Concrete of Concrete, Mortar and Cement Paste.

Concrete	Filler + Binder
Mortar	Fine Agg + Paste
Paste	Cement + Water

1. Rheology of fresh concrete includes the following except (a) stability, mobility and compactability of concrete (b) knowledge of water-cement ratio (c) study of forces involved in transmission of stress through concrete mass (d) deformation curve of fresh concrete

2. Rheological properties of concrete are independent of (a) water-content (b) ggregate shape, texture and grading (c) type of mixer (d) temperahre (e) type of cement

3. The flow properties of fresh concrete are mainly dependent upon (a) the factors affecting resistance to deformation (b) the water-cement ratio (c) the richness of the mixture (d) shape and texhre ofthe aggregate (e) fineness moduli and gradings of the aggregates

ch 1 .15

4. Chemical admixtures are (a) essential constituent material of concrete (b) types of coarse aggregates (c) Natural stone (d) ingredients in concrete other than Portland cement, water, and aggregates

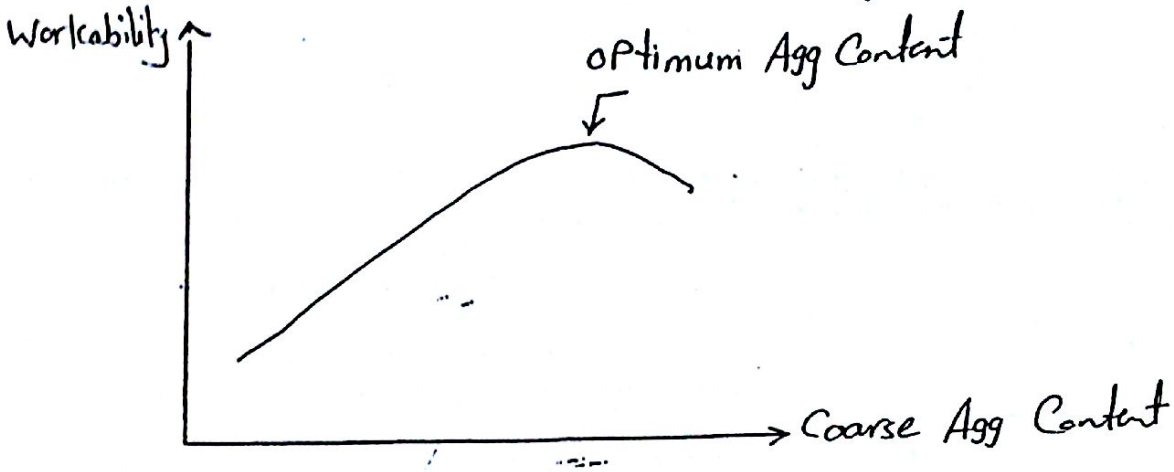
5. Workability is (a) a long-term requirement (b) a property of hardened concrete (c) a short-term requirements (d) non of the other choices

6. Mobility contributes (a) reheology (b) consistency (c) plasticity (d) shrinkage

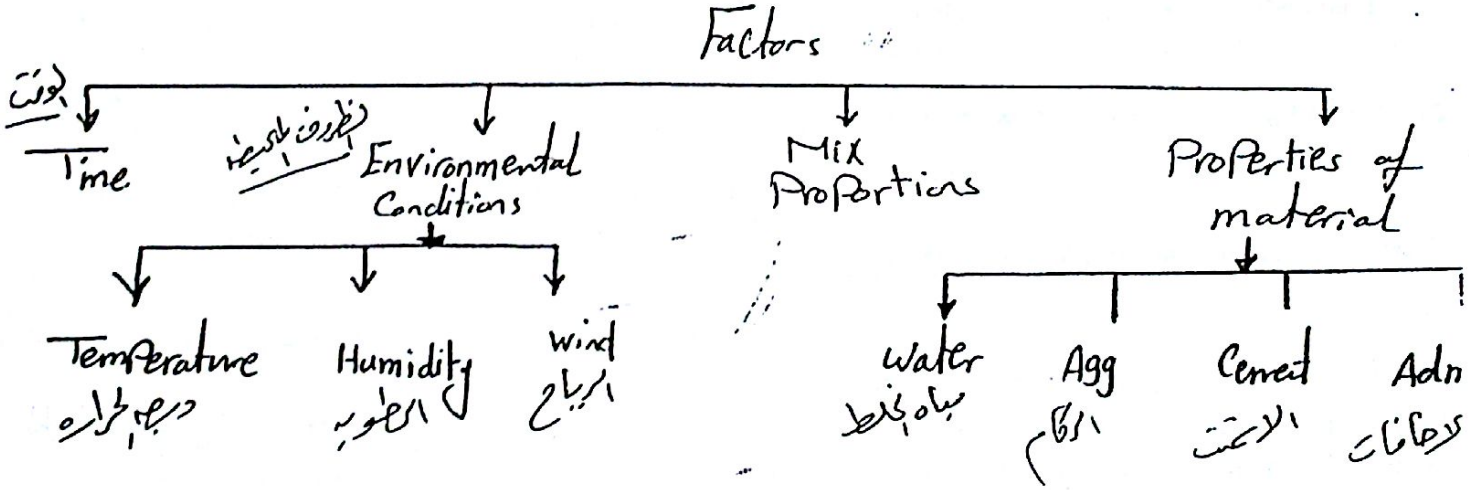
Sheet 2 — Chapter 2

Draw The Following with net sketches

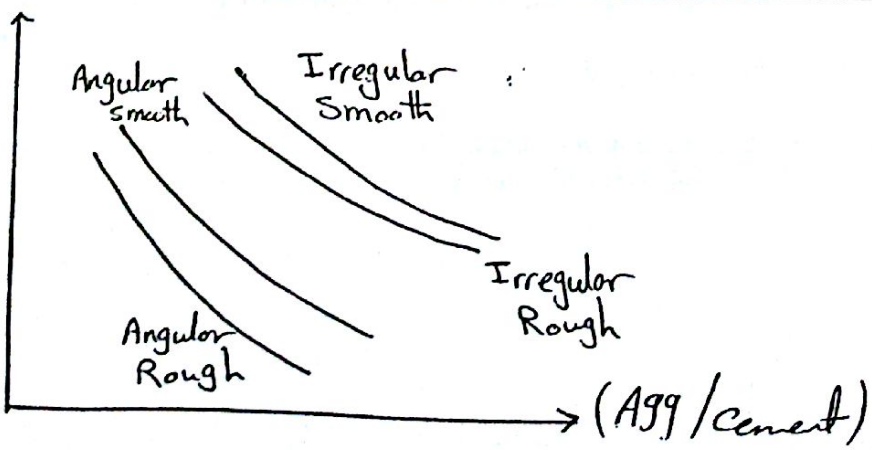
a] The effect of Agg Content on Workability of Concrete.



b] Factor effecting workability



c] The Effect of Agg shape, and texture on workability



aculty of Engineering at Mataria	HELWAN UNIVERSTY	1st √ / 2nd	Semester . Academic Year 2013/2014
Department: Civil Engineering		Exam Type (Mid/Term): Final Exam	
Course Name: (Chac. & test of materials2)		Date of Exam: 29-12-2013	
Course Code: (CV4213)		Time Allowed: Three Hours	
Level: 2nd year		Maximum Mark: 90 Degrees	

NOTE: 1- Exam is in (3) papers (4) pages including the answer sheet for question (2)
2- Submit the answer sheet of question (2) with the answer paper
3- The graphs of the mix design not including explanation of the design process, are allowed

Q1	Idea (50)%	Steps (40)%	Calculations (--)%	Final Result (10)%	Mark (30)

Draw the following with net sketches **(free hand drawings and drawings without Pencil will not be evaluated)**

1. The Bingham model that used in expressing the rheology of concrete.
2. Schematic diagram of the modified slump cone test.
3. Process of Setting and Hardening of concrete.
4. Diagrammatic Sketch of Different Types of Set of Cement.
5. Diagrammatic sketch defining the parameters defining the rheology of fresh concrete.
6. Relationship between compressive strength, tensile strength, and flexural tensile strength of concrete.
7. Graph showing the effect of the fineness of cement on the compressive strength of concrete.
8. Graph showing the effect of the chemical composition of hydrated cement on concrete strength.
9. Graph showing the effect of aggregate-cement ratio on concrete compressive strength.
10. Graph showing the effect of entrained air on compressive strength of concrete.
11. Graph showing the effect of Curing and Condition on concrete strength.
12. Graph showing the effect of specimen size on the strength of concrete.
13. The stress-strain relationship of concrete showing the maximum and failure stress and strains on the graph.
14. The deformation of concrete with time under sustained load (the creep deformation of concrete).
15. Graph showing the different types of elastic modulus of concrete.
16. Graph showing the variation of drying shrinkage and moisture movement with alternative drying and wetting of concrete.
17. The relationship between slump and the modified slump test values.
18. The relationship between slump and the compacting factor.
19. Diagrammatic sketch showing the equivalence of parameters defining workability and rheology of fresh concrete.
20. The factors affecting the workability of concrete.

Q2	Idea (-)%	Steps (-)%	Calculations (-)%	Final Result (100)%	Mark (20)

Choose the correct choice that makes the following statements correct. The choice is correctly made by filling the circle in front of the correct choice same as that● in the answer sheet of question (2), otherwise choice will not be evaluated.

1. Concrete may be described as ● an artificial stone obtained by binding together particles of relatively inert fine and coarse materials with cement paste b. a dry mix of sand, crushed stone and water c. mortar and rock d. none of the previous choices
2. The main ingredients of concrete are a. Cement paste b. fine aggregate c. coarse aggregate ● all of the other choices together
3. The strength of concrete is influenced by a. size of test machine b. size of loading plate c. size of fine aggregate ● water-cement ratio
4. The stress-strain relationship of concrete in compression is obtained by testing the cylindrical specimen under a. uniform rate of strain b. uniform rate of stress c. constant stress condition d. constant strain condition

6. The knowledge of the flexural tensile strength of concrete is useful in the design of a. reinforced concrete members b. pavement slabs and airfield runways c. pre-stressed concrete structures ● all other choices are correct together

5. The ratio of the tensile strength to the flexural tensile strength of concrete is approximately equals ● none of these choices b. 20% c. 10% d. 50%

7. The shrinkage is a affected by a. grading of aggregate b. Cement content c. Ambient conditions ● choices b and c together

8. Poisson's ratio is a. the ratio of the cement to aggregate contents ● the ratio of the lateral to the longitudinal strains c. the ratio of the flexural to the compressive strengths d. the tensile strength of concrete

9. Admixtures can only affect concrete strength by a. cooling concrete while hydration b. preventing shrinkage c. reducing concrete temperature d. changing the hydration processes and the air content

10. Aggregate strength a. is very essential for concrete strength b. is very low compared to the strength of normal concrete ● has no significant effect on the compressive strength of normal concrete.

11. The higher the fineness of cement a. the higher the rate of hydration b. the lower the early strength c. the higher the aggregate-cement ratio d. the bigger the cement particle diameter

12. Stability is defined as a. the ease in which concrete can be compacted b. the flowability of concrete c. the ability of concrete to segregate d. a condition in which the aggregate particles are held in homogeneous dispersion by matrix, and random sampling shows the same particle size distribution during transportation, placing and compaction.

13. Compactability ● is the ease with which fresh concrete is compacted b. is compaction rod of slump test c. none of these choices d. choices a and b

14. False set of concrete a. is a good property of hardened concrete b. measures the mobility of concrete ● is called plaster set d. may be related to cement content

15. Workability of concrete can be regained after ● false set b. flash set c. two hours of mixing d. adding water to harsh mix

16. The standard size of a concrete cube for compressive strength test is a. 50 mm b. 100 mm ● 150 mm d. 200 mm

17. The Vee-Bee test is suitable for testing concrete having a. very low workability b. high workability ● very high workability d. sloppy consistency

18. Rounded aggregates results in a. higher workability b. higher strength c. lower strength ● choices a and c together

19. One of the advantages of concrete is a. its high tensile strength ● the high fire resistance c. high workability d. the high flexural strength

20. Viscosity and yield stress define a. workability of concrete b. strength of concrete c. thick concrete ● rheology

Q3	Idea (50)%	Steps (25)%	Calculations (15)%	Final Result (10)%	Mark (20)

1- Make a complete mix design for the mix in the following table. Show sketches for steps of design in your answer sheet.

f_{cu} (MPa)	Slump (mm)	Cement Type	Agg. Type	Max. Agg. Size (mm)	Zone of fine Agg.	Max. W/C	Max. Cement Content (kg/m^3)	Min. Cement Content (kg/m^3)
35	30-60	OPC (CEMI)	Crushed	20	2	0.48	450	300

Helwan University		1st √	**Semester**
Faculty of Engineering at Mataria		2nd	**Academic Year 2012/2013**
Course Name:(Chac. & test of materials2)		**Time Allowed:** (1:30) Hours	
Course Code: ()		**Level:** (2nd year)	
Date of Exam: 19-11-2012		**Department:** Civil Engineering	

Q1	Idea (50)%	Steps (50)%	Calculations (-)%	Final Result (-)%	Mark (20)

Draw the following with net sketches **(free hand drawings will not be evaluated)**

1. Effect of temperature on amount of water required to change slump.
2. Loss of workability of concrete with time.
3. Slump test apparatus.
4. Effect of aggregate texture and shape on concrete workability.
5. Loss workability of concrete with time
6. Diagram showing the factors affecting workability of concrete.
7. The Kelley Ball apparatus.
8. Different types of bleeding in concrete.
9. Process of setting and hardening of concrete.
10. Relation between workability and coarse aggregate content of concrete.

Q2	Idea (-)%	Steps (-)%	Calculations (-)%	Final Result (100)%	Mark (10)

Choose the correct choice that makes the following statements correct. The choice is correctly made by filling the circle in front of the correct choice same as that●.

The higher the maximum aggregate size the higher is
○ the concrete workability ○ the aggregate surface area ○ the concrete strength
● non of these choices

One of the disadvantages of concrete is
◎ the high tensile strength ● the low strength to weight ratio
○ high fire resistance ○ its green color

Mobility of concrete is
● the ease with which a mix can flow into and completely fill the formwork
○ a measure of concrete workability ○ a measure of concrete strength
○ a measure of wetness of concrete

Flash set is
○ false set ○ true set ○ plaster set ● abnormal setting of concrete

Final set corresponds approximately to
● the mid-point of stage 3 of C3S hydration ○ the end of stage 3 of C3S hydration
○ Approximately at the beginning of stage 3 of C3S hydration ○ at any time of any stage

Workability of fresh concrete can be regained after
○ flash set ● false set ○ final set ○ 150 minutes of mixing

The short-term requirements of concrete are such

● workability and stability O bleeding O strength and durability O segregation

A smooth rounded aggregate will result in

O a good bond between aggregate and the matrix

● a weaker bond between aggregate and the matrix

O a low workable concrete

O higher hydration rate

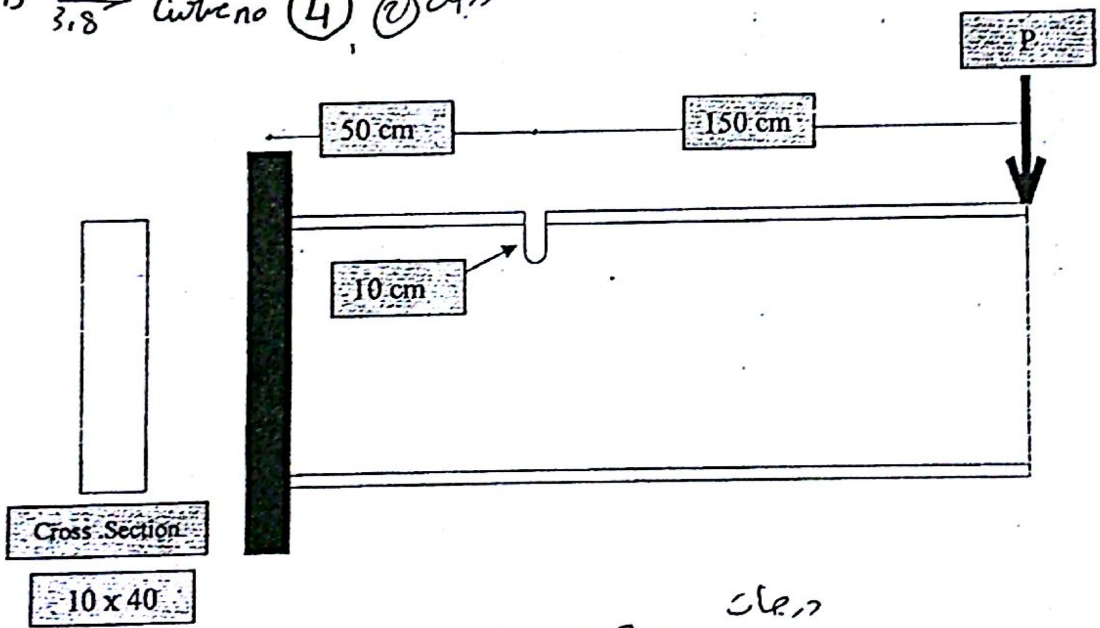
Q3	Idea (25)%	Steps (25)%	Calculations (25)%	Final Result (25)%	Mark (10)

For the Cantilever Beam shown in the figure, determine the Fracture Load P if the yield stress is 4.0 t/cm². Using Neuber's diagram, $\rho = 2.0$ cm.

$\sqrt{t/\rho}$ 2.2 → Scale (f) ② درجات

$\sqrt{b/\rho}$ 3.8 → Curve no (4) ② درجات

$S_{cc} = 3.5 - 3.6 - 3.4$ ② درجات



$\sigma_{max} = \sigma * S_{cc}$ ④ درجات

$f_y = \frac{6M}{b^2 h} * S_{cc}$

$4 = \frac{6M}{(30)^2 (10)} * 2.6 \rightarrow M = 2307.7$ t.cm $\rightarrow P = \frac{M}{L} = 15.4$ ton

2.5 → M = 6600 t.cm → $P = \frac{M}{L} = 16$ ton

2.4 → M = 6600 t.cm → P = 16.6

لو قسموا على $\Sigma = 2$

or P = 7.7 ton

or P = 8 ton

or P = 8.3 ton