



**Question One:**

Mark the following phrases true or false between brackets

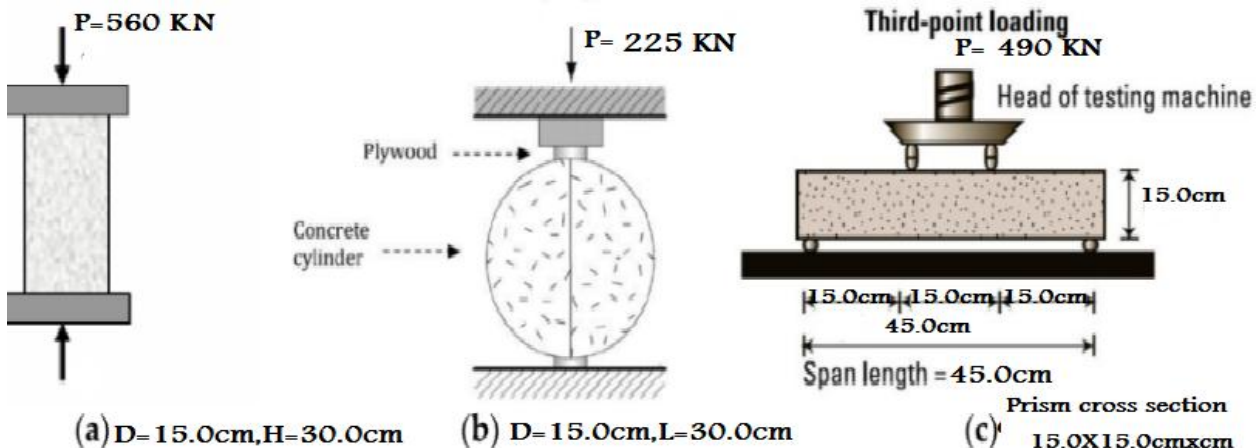
- 1) Mortar+ aggregate → concrete ( )
- 2) The initial set starts when the needle tip at 5.5 mm from the bottom ( )
- 3) The kiln temperature is about 700 °C ( )
- 4) To find the change of cement volume soundness test is needed ( )
- 5) Segregation is defined as the collection of components of a fresh concrete mixture ( )
- 6) Type four of cement contains quantity of Alite more than Belite ( )
- 7) Aggregate retained on sieve 9.5 mm are coarse aggregate ( )
- 8) Compaction test used to define workability ( )
- 9) Flow test is property of hardened concrete ( )
- 10) Zero slump is the indication of very low water-cement ratio ( )

**Question Two:**

- 1-Using neat drawing , show the types of of *concrete slump results*
- 2-Show using neat and precise curves the effect of age on *compressive strength for different w/c ratios*
- 3-Using neat curves ,show the effect of *temperature on compressive strength* of concrete
- 4-Show the influence of the *water/cement ratio and moist curing on concrete strength*(different ages of concrete
- 5-*The size of aggregate influences the compressive strength* of concrete Show this sentence using appropriate curves.

**Question Three:**

Cylindrical specimens and prism of hardened concrete were tested to find its compressive strength , tensile strength and flexural strength respectively the average load failure of specimens are shown in the figure .a)Compute the specified strength for each test in Mpa ,b)What is the relationship between compressive strength with tensile and flexural strength respectively.



Course No: CVL 2310  
 Course Title: Concrete Technology  
 Date: / /2018  
 No. of Questions: (4)  
 Time: 1hours  
 Using Calculator

University of Palestine



Final Exam  
 Second Semester  
 2017/2018  
 Total Grade:

Instructor Name: Dr.Ayed Zuhud  
 Student No.: \_\_\_\_\_  
 Student Name: \_\_\_\_\_  
 College Name: \_\_\_\_\_  
 Dep. / Specialist: \_\_\_\_\_  
 Using Dictionary-No –Closed book

**Question Four:**

Quality engineer is working in ready mix concrete factory at Gaza Strip) .He was intended to prepare a mix of *Non air entrained concrete of 30Mpa* cylindrical compressive strength with a slump of **75 mm** .The data that was given for him are as following :

- a)The C.A and F.A was oven dried ,b)The specific gravity of C.A and F.A were **2.65** and **2.7** respectively ,c)The dried oven of C.A was **1680 Kg/cm<sup>3</sup>**,d)The fine modulus of F.A was **3.0** ,e)The absorption water capacity of C.A and F.A were **2.8 and 2.0 %** respectively ,f)The max size of aggregate was **25 mm**

If it is required **3%** of results to be lower than the chrahsterestic strength and the standard deviation was **3 Mpa**

**1-Find the quantities of all materials required for the previous state listed**

*If the C.A was exposed to rain so the free moisture content was 1.5%*

**2-Find the quantities of all materials required**

(Suppose any missing data)

End of Questions  
 Good luck

| Percentage of results allowed to fall below the minimum |     |     | Value K |
|---|-----|-----|---------|
| 0.1   | ... | ... | 3.09    |
| 0.6   | ... | ... | 2.50    |
| 1.0   | ... | ... | 2.33    |
| 2.5   | ... | ... | 1.96    |
| 6.6   | ... | ... | 1.50    |
| 16.00   | ... | ... | 1.00    |

| 28-Day Compressive Strength in MPa (psi) | Water-cement ratio by weight |               |
|--|------------------------------|---------------|
|  | Non-Air-Entrained            | Air-Entrained |
| 41.4 (6000)                              | 0.41                         | -             |
| 34.5 (5000)                              | 0.48                         | 0.40          |
| 27.6 (4000)                              | 0.57                         | 0.48          |
| 20.7 (3000)                              | 0.68                         | 0.59          |
| 13.8 (2000)                              | 0.82                         | 0.74          |

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| Slump                                    | Mixing Water Quantity in kg/m <sup>3</sup> (lb/yd <sup>3</sup> ) for the listed Nominal Maximum Aggregate Size |                      |                     |                  |                      |                  |                  |                   |
|--|--|----------------------|---------------------|------------------|----------------------|------------------|------------------|-------------------|
|  | 9.5 mm<br>(0.375 in.)  | 12.5 mm<br>(0.5 in.) | 19 mm<br>(0.75 in.) | 25 mm<br>(1 in.) | 37.5 mm<br>(1.5 in.) | 50 mm<br>(2 in.) | 75 mm<br>(3 in.) | 100 mm<br>(4 in.) |
| <b>Non-Air-Entrained</b>                 |  |                      |                     |                  |                      |                  |                  |                   |
| 25 - 50<br>(1 - 2)                       | 207<br>(350)   | 199<br>(335)         | 190<br>(315)        | 179<br>(300)     | 166<br>(275)         | 154<br>(260)     | 130<br>(220)     | 113<br>(190)      |
| 75 - 100<br>(3 - 4)                      | 228<br>(385)   | 216<br>(365)         | 205<br>(340)        | 193<br>(325)     | 181<br>(300)         | 169<br>(285)     | 145<br>(245)     | 124<br>(210)      |
| 150 - 175<br>(6 - 7)                     | 243<br>(410)   | 228<br>(385)         | 216<br>(360)        | 202<br>(340)     | 190<br>(315)         | 178<br>(300)     | 160<br>(270)     | -                 |
| Typical entrapped air<br>(percentage)    | 3  | 2.5                  | 2                   | 1.5              | 1                    | 0.5              | 0.3              | 0.2               |
| <b>Air-Entrained</b>                     |  |                      |                     |                  |                      |                  |                  |                   |
| 25 - 50<br>(1 - 2)                       | 181<br>(305)   | 175<br>(295)         | 168<br>(280)        | 160<br>(270)     | 148<br>(250)         | 142<br>(240)     | 122<br>(205)     | 107<br>(180)      |
| 75 - 100<br>(3 - 4)                      | 202<br>(340)   | 193<br>(325)         | 184<br>(305)        | 175<br>(295)     | 165<br>(275)         | 157<br>(265)     | 133<br>(225)     | 119<br>(200)      |
| 150 - 175<br>(6 - 7)                     | 216<br>(365)   | 205<br>(345)         | 197<br>(325)        | 184<br>(310)     | 174<br>(290)         | 166<br>(280)     | 154<br>(260)     | -                 |
| <b>Recommended Air Content (percent)</b> |  |                      |                     |                  |                      |                  |                  |                   |
| Mild Exposure                            | 4.5  | 4.0                  | 3.5                 | 3.0              | 2.5                  | 2.0              | 1.5              | 1.0               |
| Moderate Exposure                        | 6.0  | 5.5                  | 5.0                 | 4.5              | 4.5                  | 4.0              | 3.5              | 3.0               |
| Severe Exposure                          | 7.5  | 7.0                  | 6.0                 | 6.0              | 5.5                  | 5.0              | 4.5              | 4.0               |

| Nominal Maximum<br>Aggregate Size | Fine Aggregate Fineness Modulus |      |      |      |
|-----------------------------------|---------------------------------|------|------|------|
|                                   | 2.40                            | 2.60 | 2.80 | 3.00 |
| 9.5 mm (0.375 inches)             | 0.50                            | 0.48 | 0.46 | 0.44 |
| 12.5 mm (0.5 inches)              | 0.59                            | 0.57 | 0.55 | 0.53 |
| 19 mm (0.75 inches)               | 0.66                            | 0.64 | 0.62 | 0.60 |
| 25 mm (1 inches)                  | 0.71                            | 0.69 | 0.67 | 0.65 |
| 37.5 mm (1.5 inches)              | 0.75                            | 0.73 | 0.71 | 0.69 |
| 50 mm (2 inches)                  | 0.78                            | 0.76 | 0.74 | 0.72 |
| 75 mm (3 inches)                  | 0.82                            | 0.80 | 0.78 | 0.76 |
| 150 mm (6 inches)                 | 0.87                            | 0.85 | 0.83 | 0.81 |

Notes:  
 These values can be increased by up to about 10 percentge for pavement applications.

| Maximum size of aggregate (mm) | First estimate concrete weight* (kg/m <sup>3</sup> ) |                        |
|--------------------------------|--|------------------------|
|                                | Non-air-entrained concrete                           | Air-entrained concrete |
| 9.5                            | 2280   | 2200                   |
| 12.5                           | 2310   | 2230                   |
| 19                             | 2345   | 2275                   |
| 25                             | 2380   | 2290                   |
| 37.5                           | 2410   | 2350                   |
| 50                             | 2445   | 2345                   |
| 75                             | 2490   | 2405                   |
| 150                            | 2530   | 2435                   |