

**Open Book Exam**

**Total Mark (100) degrees**

Systematic arrangement of calculations, neat drawings and clear answers are essential.

Any data not given can be reasonably assumed. The exam consists of four questions. All of them must be answered.

**Answer the following questions**

**Question (1) Choose the right answer from the following**

**(20 marks)**

- 1- Construction equipments may include the following:
  - a) Loader, bulldozer, grader and telescopic cranes
  - b) Loader, airplanes, grader and Cranes
  - c) Loader, pilling machines, slip form and tunnel form
  - d) Motor grader, scraper, bulldozer and concrete mixer
  - e) All of the above
  - f) None of the above
- 2- Modern construction systems technologies may include:
  - a) Bearing walls, slip form, tunnel form and lift slab
  - b) Skeleton systems, slip form, tunnel form and lift slab
  - c) Slip form, tunnel form, push up, lift slab and combined system
  - d) Tunnel form, slip form, push up, lift slab and precast system
  - e) All of the above
  - f) None of the above
- 3- Pilling machines can do the following:
  - a) Removal of earth work
  - b) Cutting rocks
  - c) Boring of piles or hammering of piles
  - d) Casting concrete on the pile borings
  - e) All of the above
  - f) None of the above
- 4- Scraper is a very useful machine in the following :
  - a) Earth cut and fill
  - b) Concrete casting
  - c) Lift slab process
  - d) Tunnel form process
  - e) All of the above
  - f) None of the above
- 5- Roller compacted machine can be used in:
  - a) Compacting road earth works
  - b) Compacting asphalt
  - c) Compacting concrete
  - d) Compacting all road works
  - e) All of the above
  - f) None of the above
- 6- Lift slab systems may include the following advantages:
  - a) Low cost
  - b) Cheaper Labor
  - c) Faster than other techniques
  - d) Man over on arch design
  - e) All of the above
  - f) None of the above

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- 7- Push up systems may have the following disadvantages:
- Low cast
  - High cast
  - Low productivity
  - Well trained workers
  - All of the above
  - None of the above
- 8- Form works can be manufactured from:
- Wood, steel, aluminum and any cast able materials
  - Steel and aluminum only
  - GRC only
  - Fiber glass and carbon fiber only
  - All of the above
  - None of the above
- 9- Responsibilities of construction engineer may include:
- Life cycle cost analysis
  - Value engineering techniques
  - Supervision
  - Bill of quantities
  - All of the above
  - None of the above
- 10- The main mechanical properties that must be founded in wooden form works is or are:
- Shear strength
  - Bending strength
  - Compressive strength
  - Friction strength
  - All of the above
  - None of the above

**Question (2) Choose the true or false statement from the following**

**(20 marks)**

No.	Question	True	False
1	Tunnel form is the best construction technology system for building in earthquake zones		
2	Lump sum projects means one amount of money to all the construction activities and may Favorite on the design and build projects		
3	Sustainability means the ability of the facility to withstand against any load, weather and service conditions		
4	Method of statements means, the way or ways and logical sequences on which the activity can be constructed achieving economically, quality and sustainability		
5	Optimum productivity means the best output of a machine in the optimum time		
6	Folowability of concrete mix is the main item in all new construction projects using new construction methodology		
7	Wooden form work are preferable in all tall building owing to their durability		
8	Slip form systems is suitable on hot weathering conditions without any curing precautions for casting concrete		
9	Productivity is the output of any machine equipment, system, device in a unit time		
10	Constructability is the ability of the system to be constructed any how any where		



**Question (3)**

**(25 marks)**

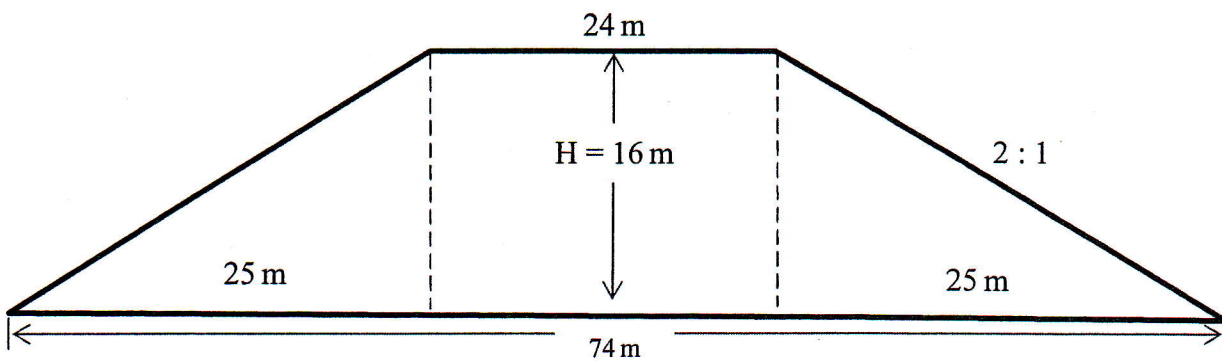
- 1- Mention the different causes of form work collapse?
- 2- Give five examples for using temporary structures form work and their uses for concrete structures?
- 3- Mention five types of special concretes and show their uses and field of application?
- 4- Mention five different construction equipments that are used in a construction projects showing their uses application and show graphically their components?
- 5- What is meant by Submittals- Limited bid – negotiation bid?

**Question (4)**

**(35 marks)**

An embankment cross section is shown in the figure (1), the soil in the embankment has to be compacted, the borrowed soil will be brought in a 10 cubic meter truck. The borrowed site soil has 15% swelling factor and specific gravities,  $G_s = 2.67$ .

- a- What will be the number of trucks for 1500 m length of embankment construction?
- b- If the embankment was covered and protected with key stone blocks ( $12 \text{ unit/m}^2$ ) what will be the total number of key stone blocks?
- c- If the borrowed soil comes from 50 km away from the embankment what will be the optimum number of the trucks to finish the process in 90 days?



Embankment cross section

Figure (1)