Heaven's Light is Our Guide
Department of Civil Engineering
Rajshahi University of Engineering & Technology

Time : 25 mins | CLASS TEST on CE 3115 | Full Marks : 20

1. Narrate the ACI code provisions for the flexural shear design of beams by WSD and USD.
2. A one-way slab is to be designed on a 18 ft span to carry a service live-load of 40 psf and superimposed dead load (excluding self weight) of 50 psf. The slab is fixed at both ends. Design the slab using $f_c' = 5000$ psi and $f_y = 60{,}000$ psi. Assume any other missing data.

Class test on CE 3121, Full marks: 20 and Time: 30 mins.

Q.1(a) what is channel transition ? show the applicaton of sp. Energy and dischare diagram in channel transition. . ***(b)*** A uniform flow of 300 cfs occurs at a depth of 5 ft in a long rectangular channel 10 ft wide. Compute the minimum height of a flat top hump that can be built on the floor of the channel in order to produce a critical depth. What will result if the hump is lower or higher than the computed minimum height ? 10

Q.2.(a) Show that for most efficient trapezoidal section the half of top width of water surface is the length of the sloping surface. ***(b)*** An irrigation channel of trapezoidal section having side slopes of 3 horizontal to 2 vertical is to carry a flow of 20 cumecs on a longitudinal slope of 1 in 5000. The channel is to be lined for which the value of friction co-efficient in manning's formula is n=0.012. Design most economical channel section. 10

Class test on CE 3121, Full marks: 20 and Time: 30 mins.

Q.1(a) What is hydrostatic law of presure distribution ? Draw pressure distribution diagram at a straight and curved flows over a spillway.

(b) Prove that energy loss in a horizontal hydraulic jump is $\Delta E = (y_2 - y_1)^3 / 4y_1y_2$

Q.2(a) The velocity distribution in a semi circular channel of diameter $2R_0$. Follows the law $u/U_0 = (y/R_0)^{1/2}$ in which y is the distance normal to the surface at which the velicity is u and $U_0 = 2.0$ m/sec is the velocity at the centre of the semicircle. If $R_0 = 2.0$ m. find U, α, β.

(b) Prove that at the critical state of flow the specific force is minimum for a given discharege.

Time: 20 minutes | CT -2 | CE 3121 | Total Mark: 20

Q.1. What do you mean by hydraulic jump? When and how hydraulic jump is formed? Also classify the hydraulic jump based on Froude number and sketch them. Write some practical applications of hydraulic jump. **10.0**

Q.2. A jet of water from a nozzle is deflected through 60^0 from its direction by a curved plate to which water enters tangentially without shock with a velocity of 30m/s and leaves with a velocity of 25 m/s. If the discharge from the nozzle is 0.8 kg/s, calculate the magnitude and direction of resultant force on the vane. **10.0**

Class Test on CE 3141

Q1. Write the important considerations for design of an intake. 10

Q2. Describe desirable qualities of pressure pipes for water transportation. 10

CE 3141

Time: 20 Minutes

Q.1 Briefly describe the factors that affect the quantity of water estimate. 08

Q.2 Write down the formulae for estimating fire demand with their proper notation. 04

Q.3 In two periods each of 20 years, a town has grown from 40000 to 160000 and then to 280000. Determine the saturation population and expected population after 25 years. 08

Class Test 2 on CE 3141

Q1. Compute the head loss through a 0.8 m sand bed consists of uni-sized, spherical sand particles having a diameter of 0.5 mm by using by Rose and Carman-Kozeny equations, the kinematic viscosity is equal to 1.003×10^{-6} m^2/s and the bed porosity is 40 percent while the rate of filtration is 250 l/m^2.min. 10

Q2. A tube well having diameter of 20 cm taps an artesian aquifer of thickness 25 m. If drawdown is 4.5 m with radius of zone of influence is 300 m and permeability is 40 m^3/unit area per day, calculate the yield of tube well in liters per hour. What variation will take place for drawdown if zone of influence is restricted to 200 m for two times of yield? 10

Class Test-2 on CE3131

Department of Civil Engineering

Full Marks: 20

Time: 20 Minutes

Q.1. Briefly explains the factors affecting compaction with figures.

Q.2. A soil having specific gravity 2.70 was compacted by standard Proctor test with 15% water content (degree of saturation 90%) and found maximum dry density 1.80 g/cm^3. Calculate the percent air content present in the specimen.

Time: 20 minutes **CT -1** **CE 3121** **Total Mark: 20**

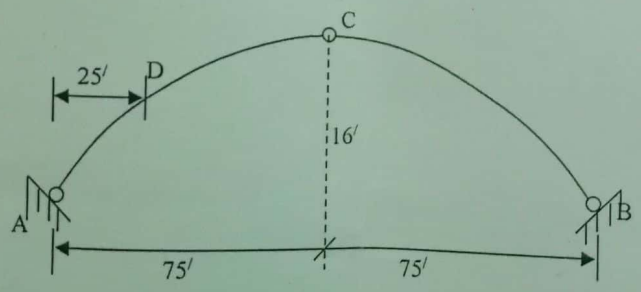
Q.1. Derive the basic differential equation for the gradually varied flow water surface profile. What are the assumptions made in the derivation of the equation? **10.0**

Q.2. Determine the type of gradually varied flow profile of a rectangular channel with a bottom width of 5.0 m and a bottom slope of 0.0007 has a discharge of 2.50 m^3/sec. In a gradually varied flow in this channel, the depth at a certain location is found to be 0.50 m. Assume, n = 0.016. Also, sketch the qualitative diagram of the identified profile. **10.0**

Class test on: CE 3111

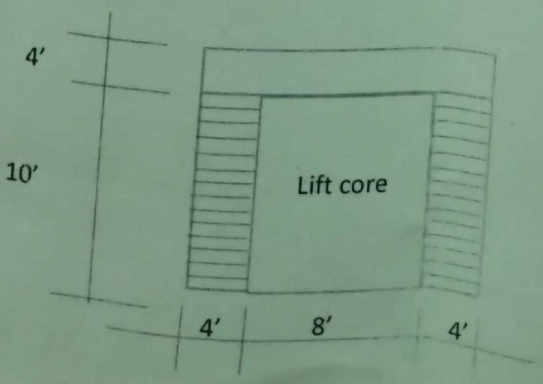
Q.1 Define arches. Mention advantages and disadvantages of arches. 03.00

Q.2 Draw influence lines for bending moment, shear force, and normal thrust at a section D of the following three hinged parabolic arch. Also obtain the maximum moment at section D for H_{15} loading. 17.00



Full Marks:20 **Class Test on CE 3115**

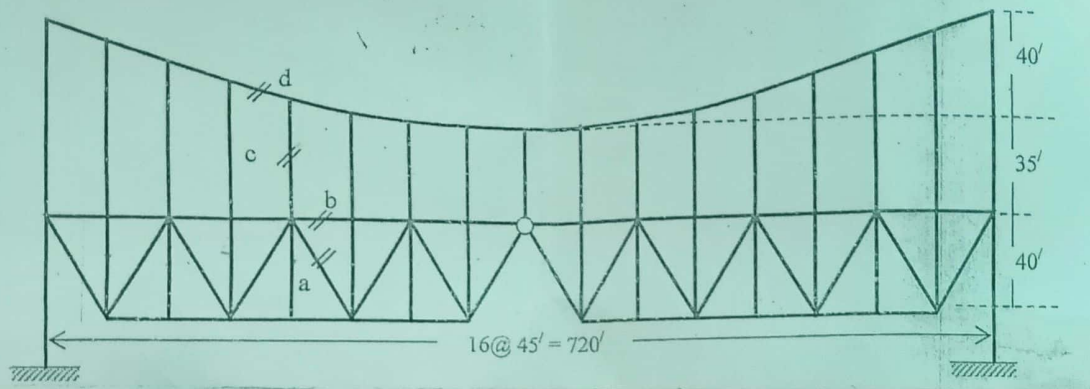
Q.1 Design the stair case shown in figure below using WSD method.The service live load is 100 psf and 3000 psi concrete is specified for use with steel with a yield stress equal to 60000 psi; and assume the step 6 inch riser and thread 10 inch. **Time: 25min**



Class test on: CE 3111

Q.1 (a) What are the advantage and disadvantages of suspension bridges? 3.00

(b) Compute the maximum stresses developed in the member 'a' and 'b', hanger 'c' and cable tension 'd' due to uniform dead load of 5 k/ft and live load of 4 k/ft of the following suspension bridge shown in figure below.



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Full Mark: 20 Class Test on CE 3115 Time: 25 min

Q.1 How a T-beam is formed? What are the factors to be considered in analyzing a beam as T-beam? **(5)**

Q.2 A commercial building has T-beams spaced 6′-6″ (center-to-center) with a 4″ thick concrete slab as shown in the figures. Using the following information: (i) Superimposed dead load (excluding conc. wt.) = 40 psf (ii) live load = 100 psf (iii) $f'c = 3000$ psi (iv) $f_y = 60{,}000$ psi.
Determine: (a) the maximum factored moment on the T-beam (b) the ultimate moment capacity of the T-beam. **(15)**