C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 54106

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Fourth Semester

Civil Engineering

15UCE406 APPLIED HYDRAULIC ENGINEERING

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

PART A - (5 x 1 = 5 Marks)

(Answer ALL Questions)

1. In open channel flow the discharge corresponding to critical depth is CO1- R

   (a) minimum (b) maximum (c) zero (d) average

2. Chezy's formula is given as …… CO2- R

   (a) V=i$\sqrt{mC}$ (b) V=C$\sqrt{mi}$ (c) V=m$\sqrt{Ci}$ (d) None of these

3. A hydraulic jump occurs when there is a break in grade from a CO3- R

   (a) Mild slope to steep slope (b) Steep slope to mild slope

   (c) Steep slope to steeper slope (d) mild slope to milder slope

4. Francis turbine is …… CO4- R

   (a) an impulse turbine (b) a radial flow impulse turbine

   (c) an axial flow turbine (d) a reaction radial flow turbine

5. To produce a high head by multistage centrifugal pumps, the impellers are connected CO5- R

   (a) in parallel (b) in series (c) in parallel and in series (d) none of the above

PART – B (5 x 3= 15 Marks)

6. Discuss the various types of flows in open channels. CO1- R

7. Define uniform flow. Give examples CO2- U

8. Define hydraulic jump. CO3- R

9. What is meant by reaction turbine? State an example. CO4- R

10. What is meant by cavitation'? State its effects. CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Water flows at rate of 20cumecs in a rectangular channel 14m wide at a velocity of 1.8m/s. Determine the specific energy of the flowing water, critical velocity and minimum specific energy corresponding to this discharge, the Froude number and state whether the flow is subcritical or super critical. CO1- App (16)

Or

(b) Calculate the critical depth for a 1.5m in the following channels: CO1- App (16)
(i) Rectangular channel B= 2.0 m
(ii) Triangular channel m= 1.5
(iii) Trapezoidal channel B= 2.0 m, m=1.0
(iv) Circular channel D = 1.50m

12. (a) Derive the equation for the discharge of open channel by chezy's constant with neat sketch. CO2- App (16)

Or

(b) (i) Water flows at a uniform depth of 2m in a trapezoidal channel having a bottom width of 6m, side slope 2 horizontal 1 vertical. If it has to carry a discharge of 65 m3/s, compute the bottom slope required to be provided. Take manning's n = 0.025. CO2- App (8)

(ii) A rectangular weir of crest length 50cm is used to measure the rate of flow of water in a rectangular channel of 80 cm wide and 70 cm deep determine the discharge in the channel if the water level is 80mm above the crest of the weir. Take velocity of approach into consideration and value of C_d = 0.62. CO2- App (8)

13. (a) A rectangular channel with a bottom width of 5 m and a bottom slope of 0.0008 has a discharge of 2.5 m^3/s. In a gradually varied flow in this channel, the depth at a certain location is found to be 0.3m. Assuming N= 0.015 Determine the type of GVF profile. CO3-App (16)

Or

(b) Find the slope of free water surface in a rectangular channel of width 15m having a depth of flow 4m. The discharge through the channel is 40m^3/s. The bed of channel is having a slope of 1 in 4000. c=60. CO3-App (16)

14.	(a)	A pelton wheel is to be designed for the following specification. Shaft power = 11,772 KW, head = 380 m, speed = 750 rpm, overall efficiency = 80%, jet diameter is not to exceed 1/6 of the wheel diameter. Determine the following; Assume Kv = 0.985, Ku = 0.4, i) Wheel diameter, ii) Number of jets required, iii) Diameter of jet.	CO4- U	(16)
		Or		
	(b)	Write short notes on the following:	CO4- U	(12)
		(i) Classification of Turbines.		
		(ii) Draft tube.	CO4- U	(4)
15.	(a)	A centrifugal pump having a outer diameter equal to two times the inner diameter and running of 1000 r.p.m. works against total head 40 m. the velocity of flow through the impeller is constant and equal to 2.5 m/s. The vanes are set back at an angle of 40^{o} at outlet if the outer diameter of the impeller is 50 mm and width at outlet is 50 mm, determine, i)Vane angle at inlet, ii)Work done by impeller on water per second and iii)Manometric efficiency.	CO5- Ana	(16)
		Or		
	(b)	Describe the principles and working of single acting reciprocating pump with neat sketch.	CO5- U	(16)