قسم : الهندسة الزراعية
امتحان : المستوى الثالث
الامتحان التحريري النهائي لمقرر:
هيدروليكا شبكات الري الحديث
الفصل الدراسي: الثاني
الدرجة الكلية : ٦٠ درجة

زمن الامتحان : ساعتان
البرنامـــج : الهندسة الزراعية والنظم الحيوية (تخصص هندسة الري والصرف)
كود المقرر : Eng 335
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This exam consists of one page
Answer all of the following questions

Question (1): *(15-Marks)*

A) In which locations the hydraulic jump may occur? *(7-Marks)*

B) Find the most economical cross section of a rectangular channel to carry 0.3 m^3/s of water, when bed slope is 1 in 1000. Assume Chezy's C=60 *(8-Marks)*

Question (2): *(15-Marks)*

A) What are the minor energy losses? *(5-Marks)*

B) Determine the difference in the elevations between the water surface in the two tanks which are connected by a horizontal pipe of diameter 0.3 m and length 400 m. The rate of flow of water through the pipe is 0.3 m^3 /s. Consider all losses and take the value of f=0.008. Also draw the hydraulic gradient and total energy line. *(10-Marks)*

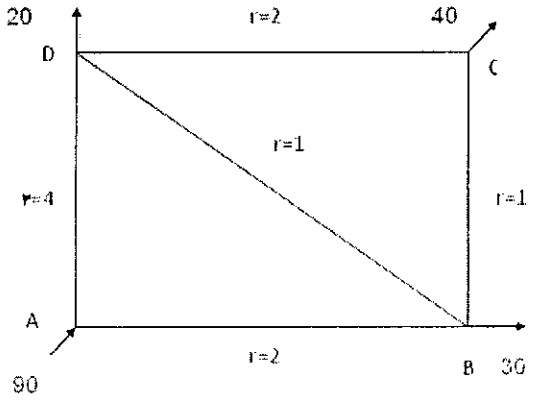
Question (3): *(15-Marks)*

A) Prove that the diameter of the nozzle for maximum transmission of power is given by $d = \left(\frac{D^5}{8fL}\right)^{1/4}$ *(7-Marks)*

B) A valve is provided at the end of a cast iron pipe of diameter 150 mm and of thickness 10 mm. The water is flowing through the pipe, which is suddenly stopped by closing the valve. Find the maximum velocity of water, when the rise of pressure due to sudden closure of valve is 196.2 N/cm². Take K of water as $19.62\times10^4\ N/cm^2$ and E for cast iron pipe as $11.772\times10^6\ N/cm^2$ *(8-Marks)*

Question (4): *(15-Marks)*

Calculate the discharge in each pipe of the network shown in the figure. The pipe network consists of 5 pipes. The head loss h_f in a pipe is given by $h_f = rQ^2$. The values of r for various pipes and also the inflow or out flow at nodes are shown in the figure.



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With best wishes

أ.د. محمود هاني رمضان
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