Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Winter Examination-2022

Subject Name : Fluid Mechanics

Subject Code : 2TE03FLM1 **Branch: Diploma (Civil)**

Semester: 3 **Date: 21/11/2022** **Time: 11:00 To 02:00** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1) Attempt the following questions **(14)**

a) In Bernoullis equation Z1 = Z2 if

(a) pipe is inclined (b) pipe is vertical
(c) pipe is horizontal (d) never

b) Volume per unit mass is

(a) mass density (b) specific weight (c) specific volume (d) specific gravity

c) When fluid is at rest, shear stress is

(a) One (b) zero (c) less then zero (b) more then zero

d) In Bernoulli's equation, kinetic energy is;

(a) Z (b) $V^2/2g$ (c) p/w (d) None of the above

e) Density of mercury is

(a) 11.6 (b) 12.6 (c)13.6 (d) None of the above

f) A large Roynold number is indication of

(a) smooth and streamline flow (b) laminar flow

(c) steady flow (d) turbulent flow(e) highly turbulent flow

g) Pitot tube is used for measurement of

(a) pressure (b) flow (c) velocity (d) discharge

h) Pressure at any point in fluid is define as

(a)area per unit force (b) force per unit area (c) both (d) none of these

i) In C.G.S system the unit of viscosity is

(a) poise (b) joule (c) newton (d) none of the above

j) The coefficient of discharge Cd, in terms of Cv and Cc is:

(a) Cd = Cv × Cc (b) Cd = Cv / Cc

(c) Cd = Cc / Cv (d) Cd = 1 / Cv .Cc

K) In a venturimeter divergent cone is kept

(a) shorter than convergent cone (b) equal to convergent cone

(c) longer than convergent cone (d) none of the above

l) Density of water is maximum at

a) 0°C b) 0°K c) 4°C d) 100°C

m) The stress-strain relation of the Newtonion fluid is

a) linear b) parabolic c) hyperbolic d) inverse type

n) The property of a fluid which enables it to resist tensile stress is known as

(a) compressibility b) surface tension c) cohesion d) adhesion

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions

a) Discuss metacenter and metacentric height with diagram **(7)**

b) Explain Pascal's Law with sketch. **(7)**

Q-3 Attempt all questions

a) Classify pressure measurement devices and explain any one. **(7)**

b) The right limb of a simple u-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The center of a pipe is 12 cm below the level of mercury inthe right limb. Find the pressure of fluid in pipe if the difference of mercury level in two limbs is 20 cm. **(7)**

Q-4 Attempt all questions

a) Enlist and explain deferent types of loss of head in pipe. **(7)**

b) Explain the Reynolds's experiment with sketch and relate the Reynold's Number to the types of flow. **(7)**

Q-5 Attempt all questions

a) State and explain continuity equation. **(7)**

b) Explain venturimeter with diagram. **(7)**

Q-6 Attempt all questions

a) Explain Hazen-William monograms **(7)**

b) Derive an equation for the force exerted by the jet on a stationary vertical plate.**(7)**

Q-7 Attempt all questions

a) Define: 1. Density 2. Weight density 3. Sp. volume 4. Sp. Gravity **(4)**

b) What are the gauge pressure and absolute pressure at a point 3 m below the free surface of a liquid having density of 1530 kg/m3if the atmospheric pressure is 1.013 N/m2 **(3)**

c) Write a short note on fluid simulation software **(7)**

Q-8 Attempt all questions

a) Discuss Darcy - Weisbach formula and Chezy's formula in detail. **(7)**

b) Compare with diagram solids, liquid, gas, vapour and explain coordinate systems**(7)**

Q-1 Attempt The Following Questions **(14)**

a) બર્નોલીનુંસમીકરણજો Z1 = Z2 હોય

a) પાઈપત્રાંસીછે b) પાઈપઉભીછેc) પાઈપઆડીછે.d) એકપણનહી

b) કદપ્રતિએકમદળએટલે

a) દળઘનત્વb) વિશિષ્ટવજન c) વિશિષ્ટકદ d) વિશિષ્ટગુરુત્વ

c) જ્યારેપ્રવાહીશાંતહોયત્યારે, શીયરસ્ટ્રેસ

a) એકહોય b) શુન્યહોય c) શુન્યકરતાઓછુd) શુન્યકરતાવધુ

d) બર્નોલીનાસમીકરણકાઇનેટિકઉર્જાજાશુંલેવામાંઆવેછે

a)Z b) $V^2/2g$ c)p/w d)none of above

e)પારાનીઘનતાકેટલીહોયછે.

a)11.6 (b) 12.6 (c)13.6 (d) None of the above

f)મોટોરેનાલડનંબરશુંદર્શાવેછે

(a) smooth and streamline flow (b) laminar flow(c) steady flow (d) turbulent flow (e) highly turbulent flow

g) pitot tube નોઉપયોગશુંમાપવામાટેથાયછે

(a)દબાણ(b) પ્રવાહ (c) વેગ(d) ડિસ્ચાર્જ

h) પ્રવાહીનાકોઈપણએકબિંદુપરઉત્પન્નથયેલદબાણનીવ્યાખ્યાશુંથશે.

(a) ક્ષેત્રફળપ્રતિએકમબળ (b) બળપ્રતિએકમક્ષેત્રફળ(c) બન્ને(d) એકપણનહી

i) C.G.S પદ્ધતિમાંસનિગધતાનોએકમ

(a) poise (b) joule (c) newton (d) none of the above

j) ડિસ્ચાર્જનોગુણાંક Cd, Cc તેમજCv નાઉપલક્ષમાંશુંથાશે

(a) Cd = Cv × Cc (b) Cd = Cv / Cc (c) Cd = Cc / Cv (d) Cd = 1 / Cv .Cc

K) વેનચયુરીમીટરમાંડાયવર્જનટકોનકેટલોરાખવામાંઆવેછે.

(a) કનર્વજનટકોનકરતાનાનો (b) કનર્વજનટકોનજેટલો(c) કનર્વજનટકોનકરતામોટો (d) એકપણપણનહી

l) પાણીનુંઘનત્વમહત્તમક્યાતાપમાનપરહોયછે.

a) 0°C b) 0°K c) 4°C d) 100°C

m) ન્યુટોનીયનપ્રવાહીનોસ્ટ્રેસ – સટ્રેનસંબંધકેવોહોયછે.

a) linear b) parabolic c) hyperbolic d) inverse type

n) પ્રવાહીનોક્યોગુણધર્મપ્રવાહીનેટેનસાઇલસ્ટ્રેસસામેરક્ષણઆપેછે.

a) compressibility b) surface tension c) cohesion d) adhesion

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all question

a)મેટાસેનટરઅનેમેટાસેનટ્રીકહાઈટવર્ણાવોડાયાગ્રામસાથે. **(7)**

b) Pascal's law આકૃતીસાથે (7)

Q-3 Attempt all questions

a) પ્રેશરમાપવાનાસાધનોર્વગીકૃતકરીકોઈએકસમજાવો. (7)

b)Simple U-tube manometer નીજમણીબાજુકેજેપારોધરાવેછે, તેહવામાંખુલ્લીછે. જ્યારેડાબીબાજુએકએવાપાઈપસાથેજોડાયેલછે, જેમા 0.9વિશિષ્ટગુરુત્વબળવાળુપ્રવાહીપસારથઈરહ્યુછે.પાઈપનુંકેન્દ્રજમણીબાજુનાપારાનામાપકરતા 12 cm નીચેછે.પાઈપનાપ્રવાહીનુંપ્રેશરશોધોજો manometer નીબન્નેબાજુવચ્ચેનાપારાનામાપનોતફાવત20cm છે. (7)

Q-4 Attempt all questions

a)પાઈપમાંથતાવિવિધપ્રકારનાloss of head વિશેસમજાવો. (7)

b)Reynold's experiment આકૃતીસાથેસમજાવોતેમજ Reynold's number નોપ્રવાહનાપ્રકારસાથેનોસંબંધસ્પષ્ટકરો. (7)

Q-5 Attempt all question

a) Continuity equation લખોઅનેસમજાવો (7)

b) Venturimeterઆકૃતિસાથેસમજાવો. (7)

Q-6 Attempt all questions

a) Hazen-William monogramsસમજાવો (7)

b) Stationary vertical plate પરજેટદ્વારાલાગેલાબળનુંસુત્રતારવો. (7)

Q-7 Attempt all questions

a) વ્યાખ્યાઆપો- 1) ઘનતા 2) વેઇટડેનસિટિ3) વિશિષ્ટકદ 4) વિશિષ્ટગુરુત્વબળ (4)

b) જો વાતાવરીયણ દબાણ 1.013 N/m2 હોય તો 1530 kg/m3 ઘનતાધરાવતા એક પ્રવાહી માટે મૂક્ત સપાટીની 3 મીટર નીચે ગેજદબાણ અને એબસોલ્યુટ દબાણશું

રહેશે? (3)

c) Fluid simulation software પરટુંકનોંધલખો. (7)

Q-8 Attempt all questions

a) Darcy's-Weisbach formula અને Chezy's formula નેવિગતમાંવર્ણવો (7)

b) આકૃતિસાથેsolid, liquid, gas,vapour નીસરખામણીકરો. અને coordinate system સમજાવો. (7)