Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma Engineering - SEMESTER–II • EXAMINATION – SUMMER 2013

Subject Code: 3320201 Date: 11-06-2013

Subject Name: Thermodynamics and Hydraulics

Time: 10:30 am - 01:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **English version is considered to be Authentic.**

Q.1 Answer any seven out of ten. **14**

1. Define system and classification of system.
2. Define following terms with units (1) Enthalpy (2) Entropy
3. Explain difference between heat energy and work energy.
4. Explain thermal equilibrium.
5. Define following term with units (1) density (2) specific density
6. Explain surface tension.
7. Explain capillarity.
8. Explain laminar flow and turbulent flow.
9. Define stream line and path line with figure.
10. Explain buoyancy and buoyant force.

Q.2 (a) Explain zeroth law of thermodynamics. **03**

OR

(a) Explain law of conservation of energy. **03**

(b) Write down condition of steady flow. **03**

OR

(b) Write down limitation of first law of thermodynamics. **03**

(c) Explain Kelvin plank statement of second law of thermodynamics. **04**

OR

(c) Explain clausius statement of second law of thermodynamics. **04**

(d) Explain Boyle's law and relation between pressure volume and temperature for that law. **04**

OR

(d) Explain charle's law and relation between pressure volume and temperature for that law. **04**

Q.3 (a) Draw the following process on P-V and T-S Diagram **03**
(1)Isochoric (2) Isobaric (3)Isothermal

OR

(a) Explain Isentropic process. **03**

(b) Define specific heat at constant pressure and at constant volume. **03**

OR

(b) Derive the relation between C_P and C_v, $C_P - C_v = R$ **03**

(c) Differentiate between process and cycle. **04**

OR

(c) Differentiate between otto cycle and diesel cycle. **04**

(d) Derive the equation of thermal efficiency of carnot cycle with the help of T-S diagram. **04**

OR

(d) An Engine working on otto cycle has suction pressure 1.5 bar and the pressure at End of compression is 15 bar, Taking γ for air = 1.4. Find out Compression **04**

ratio and Air standard efficiency of the cycle.

Q.4 (a) Classify the thermodynamics cycle and explain any one. **03**

OR

(a) Explain characteristics of otto cycle. **03**

(b) Short note on types of fluids. **04**

OR

(b) Explain Metacentre and Metacentric height. **04**

(c) Define Pascal's law and Proof of Pascal's law. **07**

Q.5 (a) Explain the working of single acting reciprocating pump with help of neat sketch. **04**

(b) A centrifugal pump is required to lift water against a total head of 60 meters at the rate of 40 lit/sec. Callculate power required to drive the pump. If the overall efficiency is 54% **04**

(c) Short note on selection of pump. **03**

(d) State major applications of pumps. **03**

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p/É ds ma4I sat na jwab Aapo. ÉÌ

É. isS3mnI VyaQya Aapo Ane isS3m nUvgIkrè kro.

Ê. nIcena pdonI VyaQya Aapo Akem shIt (É) Ae4aLpI (Ê) AeSopI

Ë. hI3 Ae+Ane vkAe+ tfavt Iqo.

Ì 4mR smtoIn ivxev`Rkro.

Í nIcena pdonI VyaQya Aapo Akem shIt (É) 6nta (Ê) ivix*3 6nta

Î p*#ta`nav`Rkro

Ï kre vahkta ivxev`Rkro

Ð IrelnIr p/vah Ane iv9I6 p/vah ivxeIqo.

Ñ S3Im Ia[n Anepa4 Ia[n nI VyaQya Aapo Aakit sa4e

ÉÈ bayoNsI Anebayo N3 fosRvxeIqo.

p/ Ê ÜAÝ 4m0Rynelksno xUy inym Iqo Anetenav`Rkro. Ë

A4va

ÜAÝ xikt sreyno inym Iqo Anetenav`Rkro. Ë

ÜbÝ S3el fIo ma3eI xrto Iqo. Ë

A4va

ÜbÝ 4m0Rynelksna p/4m inymnI myaRAo Iqo Ë

ÜkÝ 4m0Rynelksna bIja inym nuekeivn PIk iv2an Iqo Anesmjavo. Ì

A4va

ÜkÝ 4m0Rynelksna bIja inym nuk IoslysnI iv2an Iqo Anesmjavo. Ì

ÜqÝ bo{In inym Iqo Aneteinym ma3ebda` kd Anetapman no sb2 dxaR. Ì

A4va

ÜqÝ caLsR inym Iqo Aneteinym ma3ebda` kd Anetapman no sb2 dxaR. Ì

p/ Ë ÜAÝ nIceI dxaRe p/ik/yane P-V AneT-S Dayagam pr dxaR. Ë

É Aa{so coirk Ê. Aa{so bek Ë. Aa{so 4mR

A4va

ÜAÝ Aa{sSoplk p/ik/ya ivxev`Rkro. Ë

ÜbÝ Ac5 dba`eivix*3]*ma AneAc5 kdeivix*3]*manI VyaQya Aapo. Ë

A4va

ÜbÝ Cp AneCv vCce no sb2 dxaR tu Cp-Cv=R sa/tarvo. Ì

ÜkÝ p/ik/ya Anesaykl vCceno tfavt Iqo. Ì

A4va

ÜkÝ A03o saykl AneÐlzl saykl vCcen tfavt lqo. Ì

ÜqÝ T-S Dayagamnl mdd l[nekanoRsaykInl]*mly d9tanasu/tarvo. Ì

A4va

ÜqÝ A03o saykl]pr calta Ake Aine jnnaskxn p/er 1.5 bar Anekopakenna A/e 1.5 bar p/er 0e, hva ma3ey = 1.4 lo, skocn gùotr Ane]*mly d9ta xo2o. Ì

pÍ Ì ÜAÝ 4m0Rynelks saykInavglRt` kro Anegmete Akenav` Rkro. Ë

A4va

ÜAÝ A03o sayklnl la9`lkta j`vo. Ë

ÜbÝ fLy[Dna pkarnl 3lenoe lqo. Ì

A4va

ÜbÝ maskr Anemask lk ha[3 ivxev`Rkro. Ì

ÜkÝ paSklna inymnl VyaQya Aapo AnepaSklna inymnl saibtl kro. Ï

pÍ Í ÜAÝ isgl Ake3lg relpkelg pMpno kayRs@2a sm javo Aakitsh. Ì

ÜbÝ Ake skelfygl pMp 40 il3r ã skeDna dr4l 50 ml3rna kul xl8R]pr pa`lqe0e=etel AovrAol kay R ta 54% Hoy to pMp necl avva j½rl pavr xo2o. Ì

ÜkÝ pMpnl psdgl pr 3la no2 lqo. Ë

ÜDÝ pMpna mhTvna]pyogo j`avo. Ë

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