



جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة الفرات الأوسط التقنية  
الكلية التقنية الهندسية / النجف



قسم هندسة تقنيات السيارات

المرحلة الثانية

أسئلة الفصل الأول للعام الدراسي

٢٠١٧-٢٠١٦

شعبة ضمان الجودة والإدارة الجامعية

Technical Collage – Najaf  
Automotive Eng. Department  
First Semester Examination

Subject: mechanics of materials.

Time: 2 Hour

Class: 2<sup>nd</sup> Year.

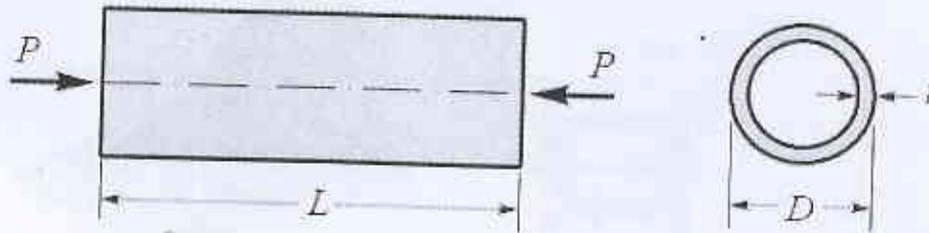
Date: / / 2017



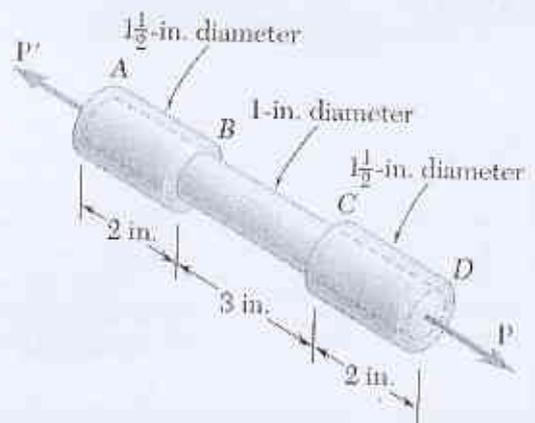
**Q.1** Solve for one branch (A or B)

**(30 MARKS)**

**A)** The cast-iron pipe shown in the figure ( $E = 70 \text{ GPa}$ ,  $\nu = 0.3$ ), which has length  $L = 0.5 \text{ m}$ , outside diameter  $D = 150 \text{ mm}$ , and wall thicknesses  $t = 15 \text{ mm}$ , is under an axial compressive load  $P = 200 \text{ kN}$ . Determine the change in (1) length  $\Delta L$ ; and (2) diameter  $\Delta D$ .



**B)** The specimen shown is made from a 1-in.-diameter cylindrical steel rod with two 1.5-in.-outer-diameter sleeves bonded to the rod as shown. Knowing that  $E = 29 \times 10^6 \text{ psi}$ , determine (a) the load  $P$  so that the total deformation is 0.002 in., (b) the corresponding deformation of the central portion BC.



**Q.2** A steel strut  $S$  serving as a brace for a boat hoist transmits a compressive force  $P = 54 \text{ kN}$  to the deck of a pier (see figure (a)). The strut has a hollow square cross section with a wall thickness  $t = 12 \text{ mm}$  (see figure (b)), and the angle  $\theta$  between the strut and the horizontal is  $40^\circ$ . A pin through the strut transmits the compressive force from the strut to two gussets  $G$  that are welded to the base plate  $B$ . Four anchor bolts fasten the base plate to the deck. The diameter of the pin is  $d_{\text{pin}} = 18 \text{ mm}$ , the thickness of the gussets is  $t_G = 15 \text{ mm}$ , the thickness of the base plate is  $t_B = 8 \text{ mm}$ , and the diameter of the anchor bolts is  $d_{\text{bolt}} = 12 \text{ mm}$ . Determine the following stresses: (1) the bearing stress between the strut and the pin; (2) the shear stress in the pin; (3) the bearing stress between the pin and the gussets; (4) the bearing stress between the anchor bolts and the

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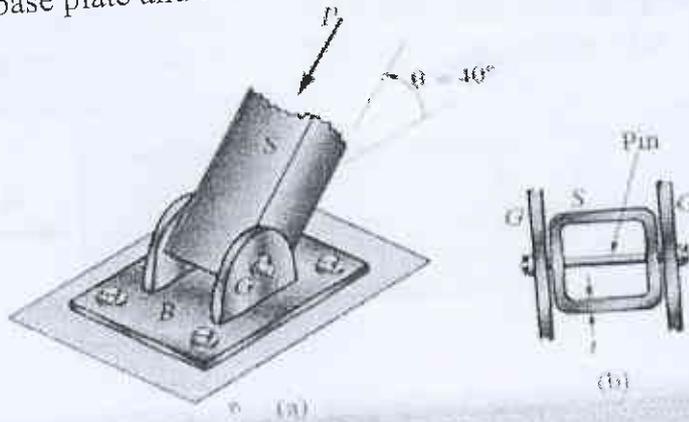
Time: 2 Hour  
Date: / / 2017

Subject: mechanics of materials.



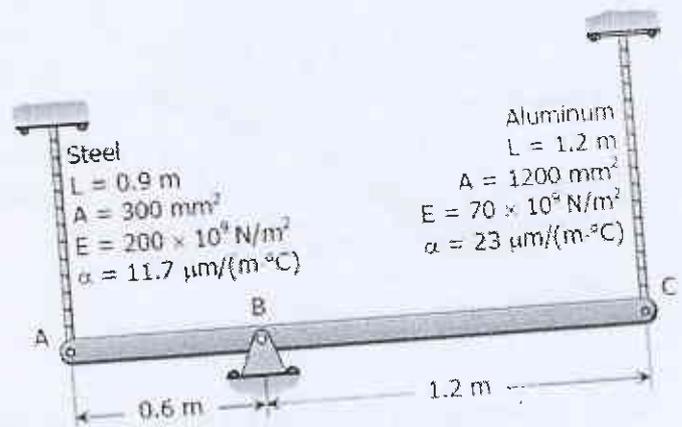
Class: 2<sup>nd</sup> Year.

base plate, and (5) the shear stress in the anchor bolts. In solution, disregard any friction between the base plate and the deck.



(35 MARKS)

Q.3| The rigid bar ABC in Figure is pinned at B and attached to the two vertical rods. Initially, the bar is horizontal and the vertical rods are stress-free. Determine the stress in the aluminum rod if the temperature of the steel rod is decreased by 40°C. Neglect the weight of bar ABC.



(35 MARKS)

Mohammed N. N.  
Jan. 08. 2017

Examiner  
Mohammed N. Altemimi



Department Header  
Dr. Haider Hassan

قسم السيارات  
ص / ص

وزارة التعليم العالي والبحث العلمي  
جامعة الفرات الأوسط التقنية  
الكلية التقنية - الميمنة - كركوك

القسم : قسم الاتصالات  
المرحلة : الثانية  
المادة : حاسوبية  
وقت الإمتحان : ساعتان  
التاريخ : 2017/1/19



اسئلة امتحان الفصل الاول 2016-2017

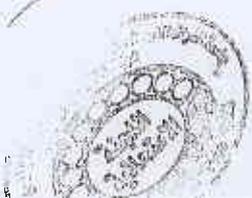
**Answer all questions**

Q1: Select the correct choice for the following statements: (Answer 5 only) (20 degree)

1. Assume txtName is a textbox control, which of the following is a valid assignment statement?  
A. txtName = 'Jones' B. . txtName.Caption = 'Jones'  
C. txtName.Text = "Jones" D. . txtName.Text = 'Jones'
2. How do we declare a variable?  
A. Using Integer command B. Using DIM command  
C. Using A and B command in the Public Class D. using private sub
3. Creates a box that can be used to retrieve one piece of information from a user.  
A. MSGBOX B. INPUTBOX C. Dialog Box D. Label
4. What is the purpose of the Toolbox?  
A. To select controls with associated event procedures B. To select controls and place on an application form  
C. To select methods to be placed on the form D. To design user defined methods
5. Which of the following is NOT a Visual Basic Control?  
A. Textbox B. Label C. Form D. Algorithm
6. What is the code used to display the words "Visual Basic" in a label named lblTitle?  
A. titleLabel.Name. Visual Basic B. "Visual Basic" = lblLabel.Text  
C. lblTitle.Text = "Visual Basic" D. lblTitle.Name = "Visual Basic"

Q2: Complete the following codes to be executed correctly: (30 degree)

1. Me.controlbox =.....
2. Textbox2.multiline=.....
3. Textbox5.passwordchar=.....
4. Label.visible=.....
5. Button2.width=.....
6. me.autoscroll= .....
7. me.minimumsize.height=.....
8. label.width=.....
9. textbox7.scrollbars=.....
10. textbox3.maxlength= .....



19/01/2017  
رئيس قسم ه.ت. الاتصالات  
لبن و عبد عبد الله



اسئلة امتحان الفصل الاول 2016-2017

Q3.A: Give the correct representation in visual basic for the following equations: (15 degree)

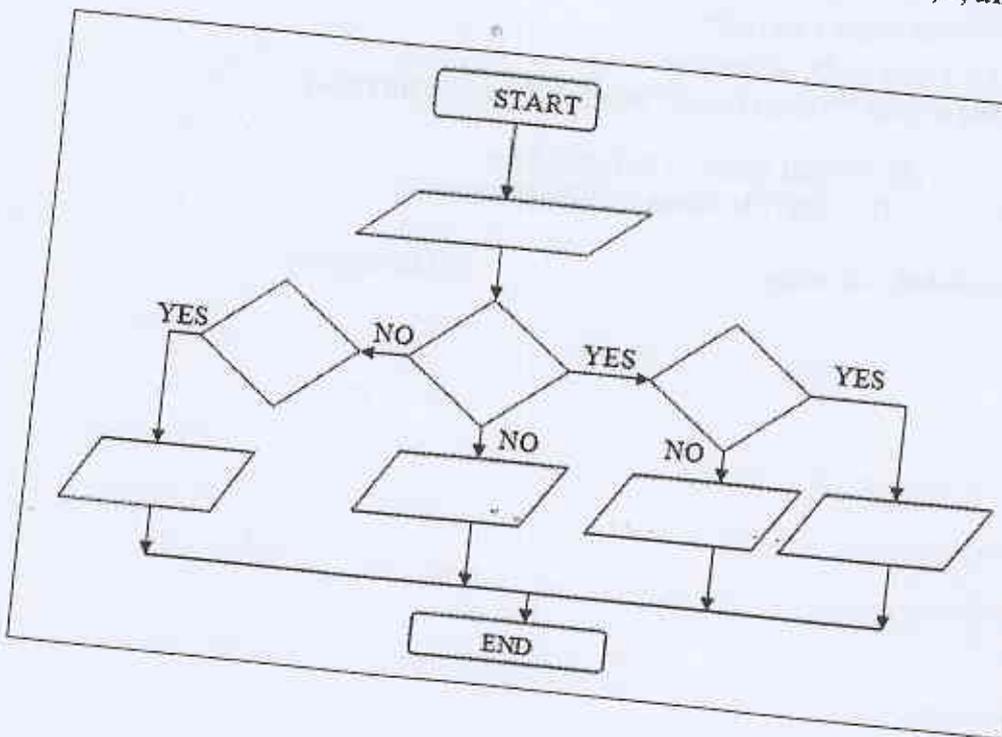
1.  $\cos(t^2) - \sin(t^2)$ .
2.  $e^t(1+\cos(3t))$ .
3.  $|89-233-x^3|$

Q3.B: What will be the value of total after execution of these statements? (10 degree)

valueI= 2

total= ( (valueI + 2) \* (valueI+ 4) ) / valueI + 1

Q4: Complete the flowchart to find the largest of three numbers A,B, and C from the following statement (25 degree)



(25 degree)

1. PRINT B
2. IS B>C
3. IS A>C
4. READ A, B, C
5. PRINT C
6. PRINT A
7. IS A>B
8. PRINT C



قسم السيارات  
صان

وزارة التعليم العالي والبحث العلمي  
جامعة الفرات الاوسط التقنية  
الكلية التقنية - الانفند / كنف

القسم : قسم الاتصالات /  
المرحلة : الثانية  
المادة : حاسبة  
وقت الإمتحان : ساعتان  
التاريخ : 2017/1/19



اسئلة امتحان الفصل الاول 2016-2017

### Answer all questions

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10. textbox3.maxlength= .....



19/01/2017  
رئيس قسم ه.ت.الاتصالات



The First Semester Exam Questions for the Academic Year 2016-2017  
First Semester

**Note:** Answer five questions only. All questions have same marks

**Q1/ Choose the correct answer:**

1. The branch of engineering-science, which deals with water at rest or motion, is called:
  - a) Hydraulics
  - b) Fluid mechanics
  - c) Applied mechanics
  - d) Kinematic
2. The ratio of specific weight of the liquid to the specific weight of a standard fluid is known as :
  - a) Specific volume
  - b) Weight density
  - c) Specific gravity
  - d) Viscosity
3. The property of a fluid which determines its resistance to sheering stress is called:
  - a) Viscosity
  - b) Surface tension
  - c) Compressibility
  - d) None of the above
4. Which of the following is an example of phenomenon of surface tension?
  - a) Rain drop
  - b) Rise of sap in a tree
  - c) Break up of liquid jet
  - d) All of the above
5. The force per unit area is called :
  - a) Pressure
  - b) Strain
  - c) Surface tension
  - d) None of the above
6. The intensity of pressure at any point in a liquid at rest is the same in all directions. The above statement is known as:
  - a) Kirchhoff's law
  - b) Pascal's law

- c) Either of the above
  - d) None of the above
7. The point of application of the total pressure on the surface is:
- a) Centroid of the surface
  - b) Center of pressure
  - c) Either of the above
  - d) None of the above
8. The intensity of pressure  $P$  is related to the specific weight  $\gamma$  of the liquid and vertical depth  $h$  of the point by the equation:
- a)  $P = \gamma h$
  - b)  $h = \gamma P$
  - c)  $P = \gamma h^2$
  - d)  $P = \gamma h^3$
9. In a steady flow the velocity:
- a) Does not change from place to place
  - b) At a given point does not change with time
  - c) May change its direction but the magnitude remains unchanged
  - d) None of the above
10. The type of flow in which the velocity at any given time does not change with respect to space is called:
- a) Steady flow
  - b) Compressible flow
  - c) Uniform flow
  - d) Incompressible flow

**Q2/ A-Define the following terms:**

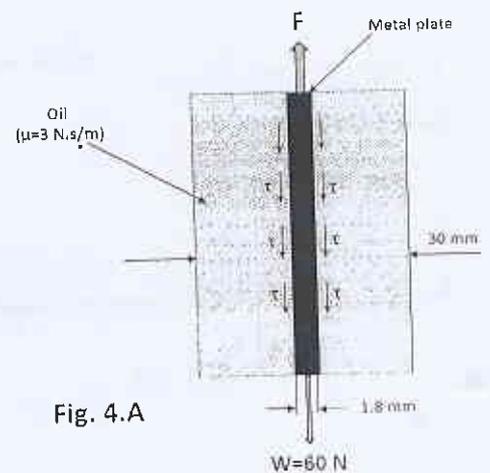
1. Steady flow
2. Non steady flow
3. Non uniform flow
4. Center of pressure
5. Atmospheric pressure
6. Gauge pressure
7. Absolute pressure
8. Fluid
9. Compressible flow
10. Turbulent flow

**Q2/B-Determine the density, specific volume and specific weight of the liquid whose specific gravity is 0.85 (take  $\rho_w = 1000 \text{ kg/m}^3$  and  $g = 9.81 \text{ m/s}^2$ )**

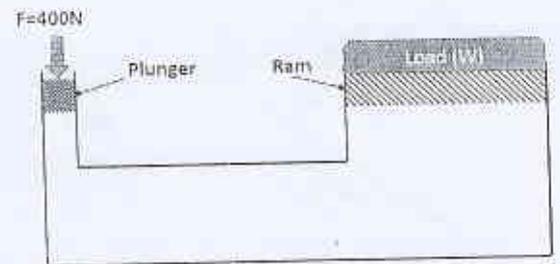
**Q3/A-** Determine the density, specific weight, and specific volume of  $\text{CO}_2$  contained in a vessel at a pressure of  $600 \text{ kN/m}^2$  absolute and temperature  $30^\circ\text{C}$  (take  $R_{\text{CO}_2} = 189 \text{ J/kg.K}$ , and  $g = 9.81 \text{ m/s}^2$ )

**Q3/B-** A soap bubble  $62.5 \text{ mm}$  diameter has an internal pressure in excess of the outside pressure of  $20 \text{ N/m}^2$ . What is tension in the soap film?

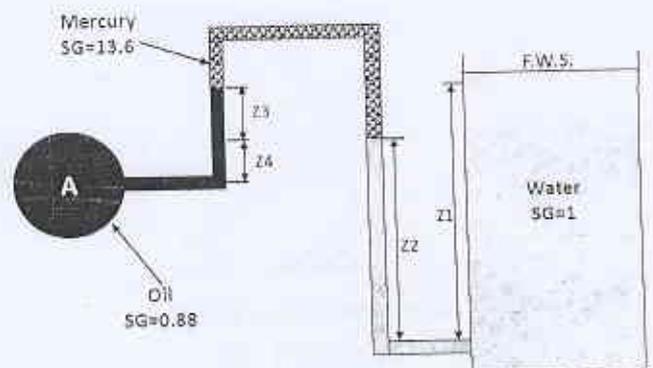
**Q4/A-** A square metal plate  $1.8 \text{ m}$  side and  $1.8 \text{ mm}$  weight  $60 \text{ N}$  is to be lifted through a vertical gap of  $30 \text{ mm}$  of infinite extent. The oil in the gap has specific gravity of  $0.96$  and viscosity of  $3 \text{ N.s/m}^2$  as shown in Fig. 4.A. If the metal plate is to be lifted at a constant speed of  $0.12 \text{ m/s}$ . Determine: (1)-Contact area of plate with oil, (2)-Thickness of the oil film, (3)-Shear stress, and (4)-Force required  $F$



**Q4/B-** The diameter of ram and plunger at a hydraulic press are  $200 \text{ mm}$  and  $30 \text{ mm}$  respectively. Find the weight lifted by the hydraulic press when the force applied at the plunger is  $400 \text{ N}$  as shown in Fig.4.B.



**Q5/A-** From Fig.5.A determine the absolute pressure in pipe A that contains oil of specific gravity  $=0.88$ . Take  $Z_1=0.66 \text{ m}$ ,  $Z_2=0.33 \text{ m}$ ,  $Z_3=0.165 \text{ m}$ , and  $Z_4=0.11 \text{ m}$ . Assume an atmospheric pressure  $105 \text{ KPa}$ .



**Q5/B-**An isosceles triangular plate of base 3 m and altitude 3 m is immersed vertically in an oil of specific gravity 0.8 as shown in **Fig.5.B**. The base of the plate coincides with free surface of oil. Determine: (1)-total pressure on the plate, and (2)-center of pressure (take  $\rho_w = 1000 \text{ kg/m}^3$  )

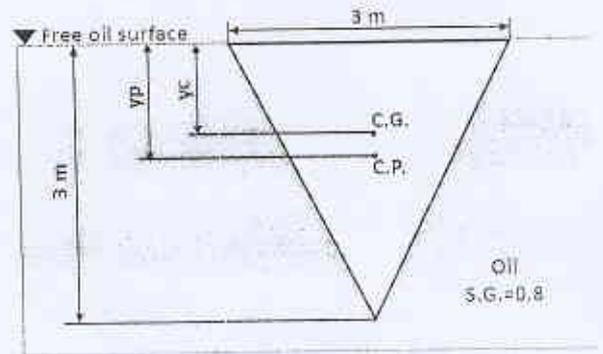


Fig. 5.B

**Q6/A-Fig.6.A** shows a curved surface LM, Which is in the form of a quadrant of a circle of radius 3 m, immersed in water. If the width of gate is unity, calculate the horizontal and vertical components of the total force acting on the curved surface.

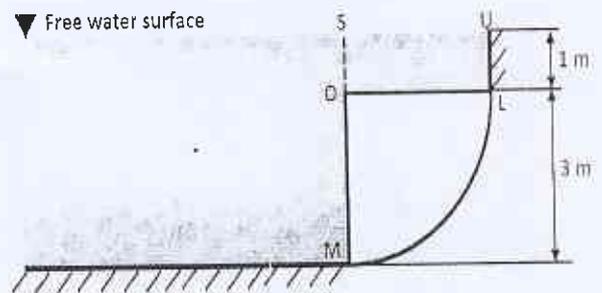


Fig. 6.A

**Q6/B-**A pipe (1) 450 mm in diameter branches into two pipes (2 and 3) of diameters 300 mm and 200 mm respectively as shown in **Fig.6.B**. If average velocity in 450 mm diameter pipe is 3 m/s find: (1)-discharge through 450 mm diameter pipe, and (2)-velocity in 200 mm diameter pipe if the average velocity in 300 mm pipe is 2.5 m/s.

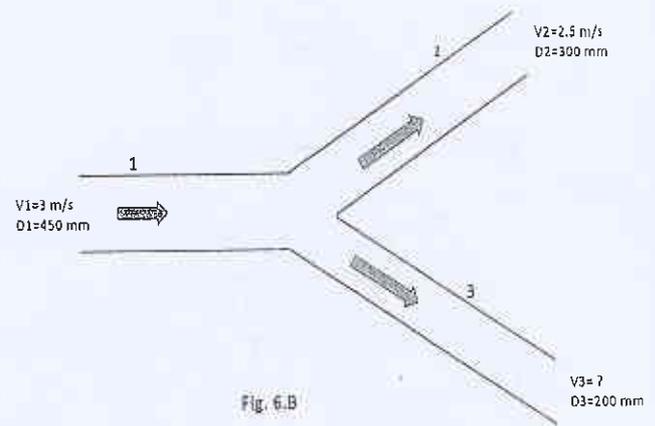


Fig. 6.B

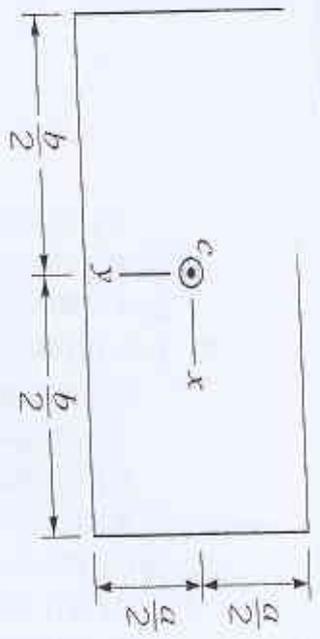
*Dhafer*

Assist Prof.  
Dr. Dhafer Manea Hachim

*Good Luck*

*Hiader H.*

Head of Department  
Dr. Hiader H.



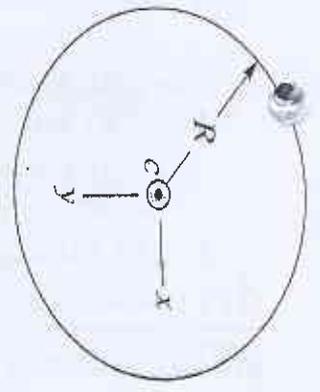
(a)

$$A = ba$$

$$I_{xc} = \frac{1}{12} ba^3$$

$$I_{yc} = \frac{1}{12} ab^3$$

$$I_{xyc} = 0$$

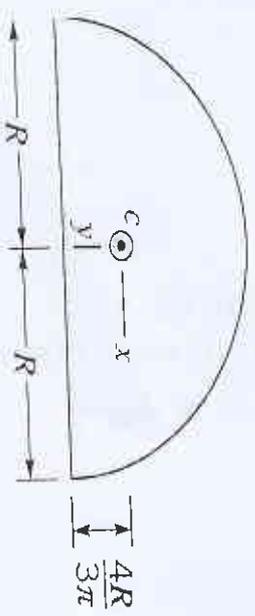


(b)

$$A = \pi R^2$$

$$I_{xc} = I_{yc} = \frac{\pi R^4}{4}$$

$$I_{xyc} = 0$$



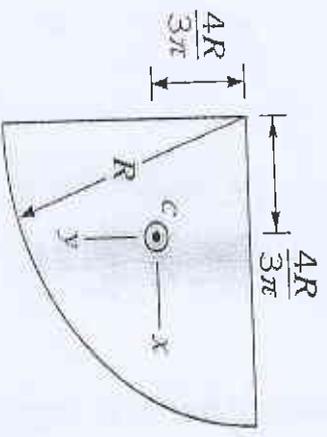
(c)

$$A = \frac{\pi R^2}{2}$$

$$I_{xc} = 0.10988R^4$$

$$I_{yc} = 0.3927R^4$$

$$I_{xyc} = 0$$

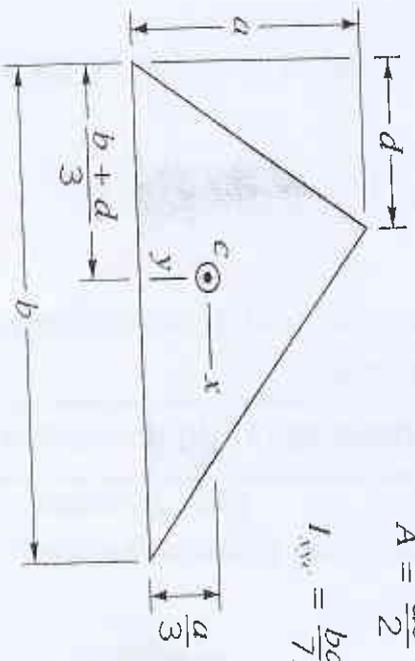


(d)

$$A = \frac{\pi R^2}{4}$$

$$I_{xc} = I_{yc} = 0.054888R^4$$

$$I_{xyc} = -0.01647R^4$$



(e)

$$A = \frac{ab}{2}$$

$$I_{xc} = \frac{ba^2}{36} (b - 2d)$$



المادة :- الرسم الميكانيكي

السنة :- <sup>2</sup> الرسم سيارات

الزمن :- <sup>2</sup> عشرين

الممتحن :- د. تحسين علي

امتحان الفصل الأول للعام الدراسي 2016 - 2017

Q1/ (A) Define five only:-

(30 marks)

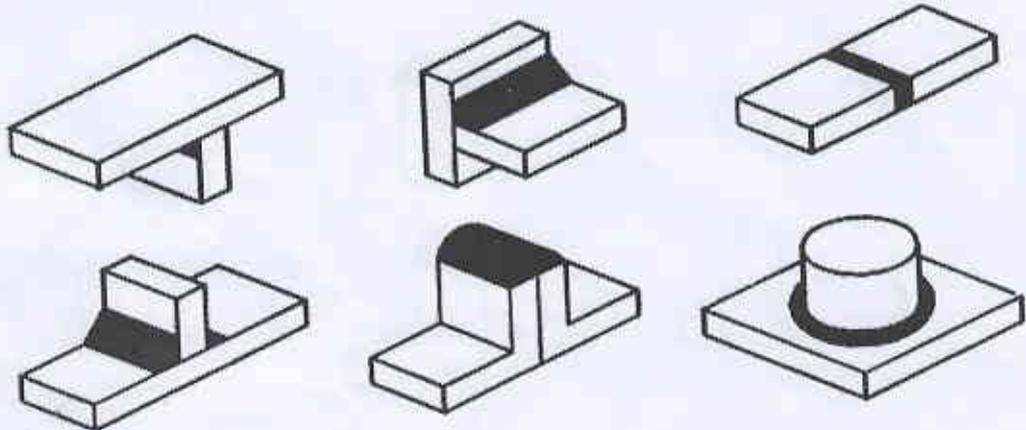
- 1 – Helical Gears
- 2 – Circular pitch
- 3 – Dedundum circle
- 4 – Deviation
- 5 – Tolerance
- 6 – Actual size

Q1/(B) What are the differences between interference fit and Transition fit?

(10 marks)

Q2/ Draw at least two views for the following welding joints with a suitable scale, and mark the weld with the suitable symbol:- (choose two joints)

(30 marks)



**Q3/ Draw a front and side view for the conical gear with the following data:-**

**(30 marks)**

- 1- Number of teeth = 30
- 2- The module = 6
- 3- The shaft diameter = 30 mm
- 4- The width of the tooth face = 40mm
- 5- Draw the dimensions on the views also.



**Good luck**

**Dr. tahsean ali**

قسم الميكانيكا  
ص/ص

Subject: **Engines Technology** Ministry of Higher Education  
and Scientific Research  
Al-Furat Al-Awsat Technical University  
Engineering Technical College / Najaf

Date: /1/2017

Time: **2 hours**  
Class: **2<sup>rd</sup>**

Note : Answer **four** questions only

Q1/

Define **four**

(20 marks)

- 1-Internal Combustion Engine
- 2-Inlet manifold
- 3- Exhaust manifold
- 4-Tow stork engine
- Four stork engine

Q2/

A-What are properties the ideal antifreeze solutions which is used to cooling system?

(10 marks)

B-what types of the cooling system ?as well as what are the disadvantages all of them?

(10 marks)

Q3 / What are Components Fuel Supply System. As well as what functions each of them?

(20 marks)

Q4/what are components the Mechanical fuelpump?In addition to What the purpose of each of part ?

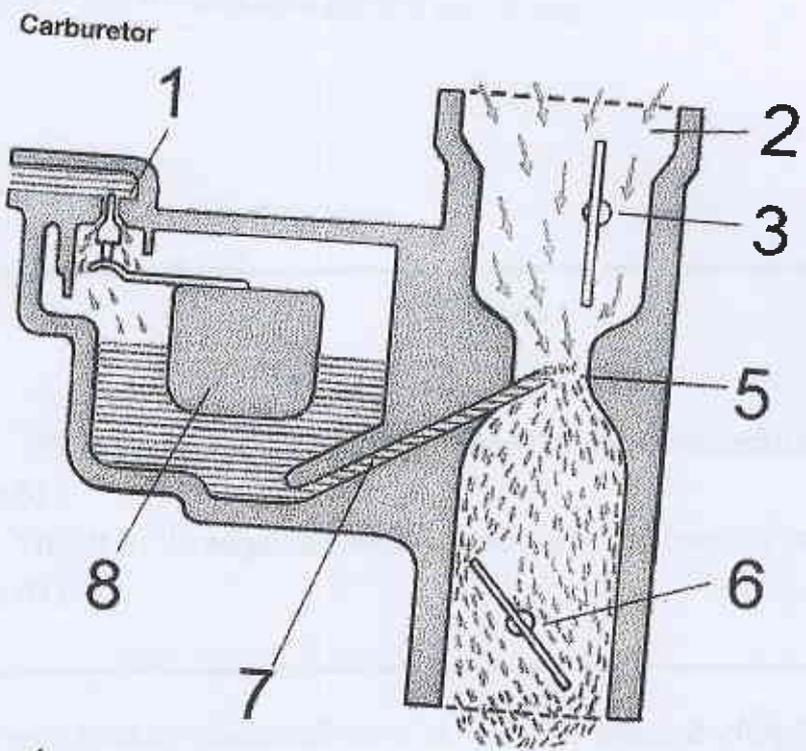
(20 marks)

Q5.A/ Explain how the carburetor is work (operation).

(10 marks)

Q5.B/ Name the parts in the figure below

(10 marks)



Teacher  
Hyder Ali



Head of Department

GOOD LUCK

المرحلة: الثانية.

المادة: رياضيات.

الزمن: ساعتان.

الممتحن: وسام احمد عبد الواحد.



العام الدراسي ٢٠١٦-٢٠١٧

امتحان الفصل الاول

وزارة التعليم العالي والبحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية/النجف

قسم السيارات

Attempt all questions.

All questions have equal marks .

Q1: Solve one of the branches

A: Find the equation of the plane, which contains the following two lines;

$$\frac{x-5}{2} = \frac{y+1}{3} = \frac{z-1}{-1} = t_1,$$

$$\text{And } \frac{x-2}{4} = \frac{y-1}{6} = \frac{z}{-2} = t_2.$$

B: Find the point of intersection of the line:

$$\frac{x-5}{2} = \frac{y-1}{4} = \frac{z-1}{1} = t,$$

with the plane:

$$2x + 3y + z = 5$$

Q2: Reverse the orders, and then solve the following integration:

$$\int_0^4 \int_0^{x+2} dydx$$

Q3: Find  $df/dt$  for the following function:

$$f = 2ye^x - e^z \quad x = \ln(t^2 + 1) \quad y = t \quad z = 2$$



Q3: Solve the following differential equations:

1.  $\frac{d\theta}{d\beta} = -\frac{\beta\sqrt{1-\theta^2}}{1+\beta^2}$

2.  $\frac{d\mu}{d\varepsilon} = \frac{\varepsilon + \mu}{\varepsilon - \mu}$

3.  $(e^{y/x} + 1)dx - dy = 0$

Good Luck

توقيع رئيس القسم

توقيع مدرس المادة



قسم السيارات  
سارح

المرحلة: الثانية		وزارة التعليم العالي و البحث العلمي
المادة: محركات احتراق داخلي		جامعة الفرات الاوسط التقنية
الزمن: ساعتان		الكلية التقنية الهندسية النجف
الممتحن: د. حيدر حسن عبد		قسم هندسة تقنيات السيارات

Q1) A-Actual cycle efficiency is much lower than the air standard efficiency due to various losses occurring in the actual engine. Write and describe three losses? (15 degree)

B- What is the percentage change in the efficiency of Otto cycle having a compression ratio of 8, if the specific heat at constant volume increases by 3%? (10 degree)

Q2)A- compare between OTTO, DIESEL AND DUAL CYCLES (10 degree)

B- A small truck has a four-cylinder, four-liter CI engine that operates on the air-standard Dual cycle using light diesel fuel at an air-fuel ratio of 21. The compression ratio of the engine is 15:1 and the cylinder bore diameter is 10.0 cm. At the start of the compression stroke, conditions in the cylinders are 60°C and 100 KPa with a 3% exhaust residual. It can be assumed that 30% of the heat input from combustion is added at constant volume and the Residual at constant pressure. Calculate: (15 degree)

1. temperature and pressure at each state of the cycle
2. indicated thermal efficiency
3. engine volumetric efficiency

Q3)A- write and describe the internal combustion engine tests depends on the constant speed. (10 degree)

B- 3L V6 SI engine operates on 4-stroke, the power and work at the crank shaft is 77.3 Kw and 0.45 KJ respectively, the engine is running with an air-fuel ratio  $AF = 15$ , a fuel heating value of 44,000kJ/kg, mass of air entering for each cylinder is 0.0005 kg, a combustion efficiency of 97%, and the mechanical efficiency of the engine is 90%. Calculate: (15 degree)

1. Volumetric efficiency
2. Brake specific fuel consumption
3. Brake thermal efficiency

Q4)A- a pickup truck has a five liter V6, SI engine operate at 2400 rpm. The compression ratio  $r_c=10.2:1$ , the volumetric efficiency= 0.91, and  $S=0.92B$ . calculate 1. Air flow rate into engine, average piston speed and clearance volume of one cylinder. (15 degree)

B- define five of the following: 1.bore, 2. Stroke, 3. Block, 4. Camshaft, 5. Head, 6. Crankshaft and 7. Connecting rod (10 degree)

DR. HYDER HASSAN



GOOD LUCK

قسم السيارات  
1/5

Ministry of Higher Education  
and Scientific Research  
Al-Furat Al -Awsat Technical University  
Engineering Technical College/Najaf 2016 – 2017 Exam

Subject :Automobiles Electricity  
Class : 2<sup>nd</sup>  
Time : 2 hours  
Exam : 1<sup>st</sup> semester

Note : ( Answer four questions )

Q 1 / Define the following . ( 25 - Marks )

1- electrolyte 2 - Lead strap 3 - armature 4 - starting system 5 – hydrometer

Q 2 / What is the criteria must meet the charging system ( When the engine is running ).

( 25 – Marks )

Q 3 / Complete the following sentences : ( 25 – Marks )

1-when the alternator voltage is less than the battery voltage the direction of current flow is from .....to .....

2- the minimum starting speed in the starting system about ..... rev /min .

3- ..... using to connecting the battery to the vehicle electrical system .

4- Alkaline batteries consist a positive plate it is ..... and negative plate it is .....

5- the load placed on an alternator can be considered as falling under three separate heading ..... , ..... And .....

Q 4 / ( A ) Comparing between the phase star and phase delta connection in the alternator . ( 10 – Marks )

( B ) explain and draw the flowchart indicated that control voltage regulator in the charging system . ( 15 – Marks )

Q 5 / what are the factors that ability to reach this minimum speed in the starting system .

( 25 Marks )

Examiner  
Mohammed Ali

..... All The Best.....

Head of Department  
Dr . Haider Hasan