



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



قسم هندسة تقنيات السيارات

المرحلة الأولى

أسئلة الامتحان النهائي للعام الدراسي

٢٠١٥-٢٠١٦

الدور الثاني

شعبة ضمان الجودة والإدارة الجامعية



Subject: Thermodynamic
 Time: 3 hours

Class: 1st year
 Date: / 5 / 2016

Notes// 1. Please read the questions carefully, 2. Answer all questions

Useful data: ($g = 9.81 \text{ m/s}^2$, density of mercury (Hg) : $\rho_{\text{Hg}}=13595 \text{ kg/m}^3$, For ideal gas air : $K=1.4$, $R= 0.287 \text{ kJ/kg} \cdot \text{K}$, $C_p=1.005 \text{ kJ/kg} \cdot \text{K}$, $C_v=0.718 \text{ kJ/kg} \cdot \text{K}$)

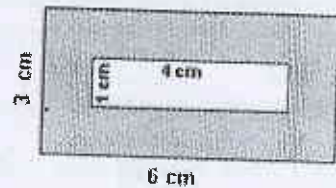
Q1\ Multiple Choice: Identify the choice that best answers of the following questions.

1. The measured temperature of a system is 20°C . Its exact absolute temperature in K is:

- A) 303.00 K B) 293.15 K C) 183.15 K D) 203.15 K

2. A rectangular piece of metal has a hole cut in its center (1cm high by 4cm wide) as shown in the figure at right. As the metal is heated from (0°C to 150°C), what will happen to the dimensions of the hole?

- A) both height and width will increase
 B) both height and width will decrease
 C) both height and width will remain unchanged
 D) height will decrease while width will increase



3. When either of mass or energy is not allowed to cross the boundary of a system; it is then called:

- A) simple system B) open system C) isolated system D) none of these

4. The phase change from a solid to a vapor is referred to as

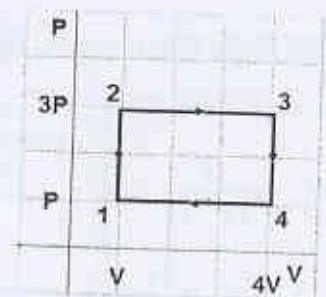
- A. vaporization. B. condensation C. sublimation. D. melting.

5. The work needed to adiabatically compress 1 kg/s of air from 20 to 200°C in a steady flow process is nearest:

- A) 180 kW B) 130 kW C) 90 kW D) 70 kW

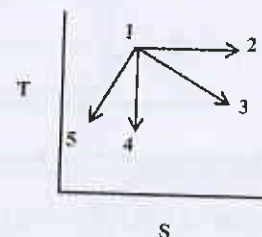
6. The change of the state of an ideal gas is presented by the diagram. What is the ration between work done on the gas during the process $2 \rightarrow 3$ and work done on the gas during the process $4 \rightarrow 1$?

- A) -2/1
 B) - 1/3
 C) -4/1
 D) -3/1



7. Which of the following processes, shown in the figure below, represents the throttling of an ideal gas?

- A) 1to2
 B) 1to 3
 C) 1to 4
 D) 1to 5



8. A sample of ideal gas has an internal energy (U) and is then compressed to one-half of its original volume while the temperature stays the same. What is the new internal energy of the ideal gas in terms of (U)?

- A) U B) $1/2U$ C) $1/4U$ D) $2U$



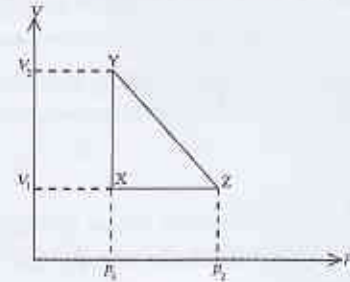
Subject: Thermodynamic
Time: 3 hours

Class: 1st year
Date: / 5 / 2016

Notes// 1. Please read the questions carefully, 2. Answer all questions

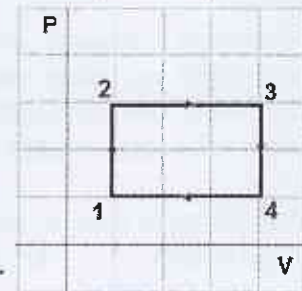
9. The graph shows the variation with pressure (p) of the volume (V) of a sample of gas. The work done during the change of state from X to Y is:

- A) zero
- B) $p_1 (V_2 - V_1)$
- C) $p_2 V_2 - p_1 V_1$
- D) $\frac{1}{2} [(p_2 - p_1) (V_2 - V_1)]$



10. The state of an ideal gas is changed in a closed path 1→2→3→4→1. Which of the following is true about work done on the gas?

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| <u>Work 1→2</u> | <u>Work 2→3</u> | <u>Work 3→4</u> | <u>Work 4→1</u> |
| A) $W > 0$ | $W = 0$ | $W < 0$ | $W = 0$ |
| B) $W < 0$ | $W = 0$ | $W = 0$ | $W > 0$ |
| C) $W = 0$ | $W > 0$ | $W = 0$ | $W < 0$ |
| D) $W = 0$ | $W < 0$ | $W = 0$ | $W > 0$ |



Q2. \\ The pressure in a gas pipe is measured by a mercury manometer as shown in the figure. One leg of manometer is open to atmosphere. If the difference in the height of mercury column in the two legs is 450 mm. Barometer reads the atmospheric 755 mm of mercury (Hg). Compute the pressure in the pipe in (kPa) and (bar). (15%)

Q3. \\ Show that (For only three): (15%)

- A) $\dot{W}_m = \dot{m}(h_e - h_i)$ [For adiabatic compressor]
- B) $C_v = \frac{R}{(k-1)}$ [For an ideal gas]
- C) $\Delta S = C_v \ln\left(\frac{T_2}{T_1}\right)$ [For an ideal gas during constant volume process]
- D) $v = v_f + x v_{fg}$ [For pure substance steam]

Q4. \\ Answer only Two branches: (20%)

A \\ Complete the following table for Refrigerant 134a:

T (°C)	P (kpa)	u (kJ/kg)	Phase Description
-32			Saturated liquid
	14.	186	
85			Saturated vapor
9.	7.		
	160	203.2	



Subject: Thermodynamic
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Class: 1st year
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Notes// 1. Please read the questions carefully, 2. Answer all questions

B Air an ideal gas at 1 bar and 300K is compressed until the final volume is one-sixteenth of the original volume, following a polytropic process $Pv^{1.25} = \text{const}$. Calculate (a) the final pressure and temperature of the air, (b) the work done during this process.

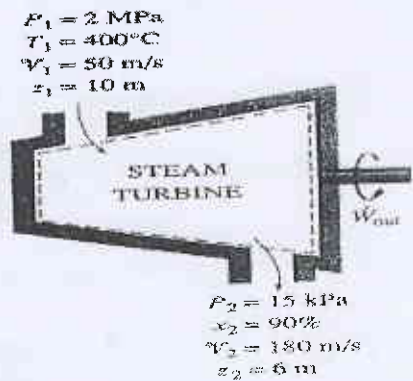
C Five kilograms of saturated vapor water at 1Mpa is contained in a cylinder fitted with a movable piston. This system is now heated at constant pressure until the temperature of the steam is 300°C. Calculate: (a) the work done by the steam, and (b) the change entropy during this process.

Q5. \\ Answer only Two branches:

(20%)

A Air at 10 °C and 80 kPa enters the diffuser of a jet engine steadily with a velocity of 200 m/s. The inlet area of the diffuser is 0.4 m². The air leaves the diffuser with a velocity that is very small compared with the inlet velocity. Determine (a) the mass flow rate of the air and (b) the temperature of the air leaving the diffuser.

B The mass flow rate of the steam flowing through an adiabatic steam turbine is 5.74 kg/s, and the inlet and exit conditions of the steam are as indicated in the figure. Determine the power output of the turbine.



C Complete the following table for water:

T (°C)	P (kpa)	h (kJ/kg)	Phase Description, x =..., if applicable
	1500	844.55	
135		2455.5	
	5000		Saturated vapor, x=1
	3500	3338.1	
180	5000		

Q6 A refrigeration unit is cooling a space to (-5°C) by rejecting energy to the atmosphere at 20°C. It is desired to reduce the temperature in the refrigerated space to (-25°C). Calculate the minimum percentage increase in work required, by assuming a Carnot refrigerator, for the same amount of energy removed. (10%)

Head of Dept



With Best Wishes

[Signature]
 Lecture\ Safah M.S.

المرحلة: الاولى

المادة: الميكانيك

الزمن: ثلاث ساعات

الممتحن: د. حيدر حسن عبد



وزارة التعليم العالي و البحث العلمي

جامعة الفرات الاوسط التقنية

الكلية التقنية الهندسية النجف

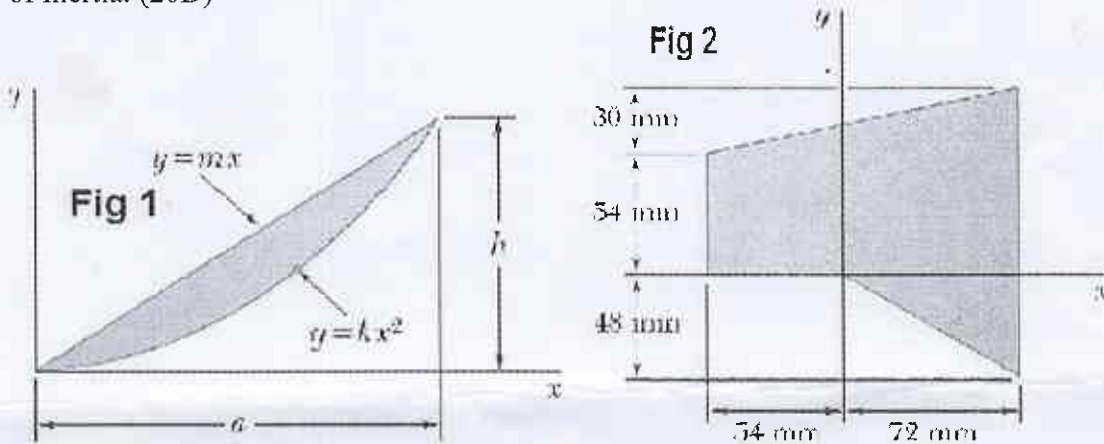
قسم هندسة تقنية السيارات

الدور الثاني 2015-2016

Note: Answer all questions

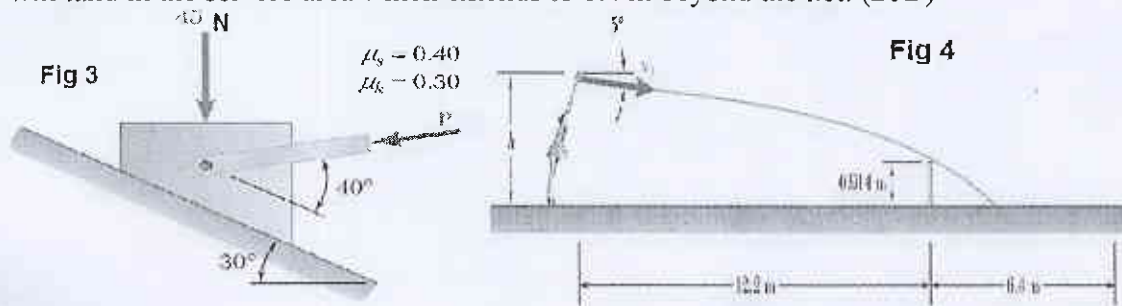
Q1) Determine by direct integration the centroid of the area shown in Figure 1. Express your answer in terms of a and h . (20D).

Q2) Locate the centroid of the plane area shown in Figure 2, and determine the moment of Inertia. (20D)



Q3) Determine whether the block shown is in equilibrium and find the magnitude and direction of the friction force when $P = 60$ N. (20D)

Q4) A tennis player serves the ball at a height $h = 2.5$ m with an initial velocity of v_0 at an angle of 5° with the horizontal. Determine the range for which of v_0 for which the ball will land in the service area which extends to 6.4 m beyond the net. (20D)



Q5) Based on experimental observations, the acceleration of a particle is defined by the relation $a = -(0.1 + \sin x/b)$, where a and x are expressed in m/s^2 and meters, respectively. Knowing that $b = 0.8$ m and that $v = 1$ m/s when $x = 0$, determine (a) the velocity of the particle when $x = -1$ m, (b) the position where the velocity is maximum, (c) the maximum velocity. (20D)

د. حيدر حسن عبد



Subject: Dos and Windows
Time: 3 hours

Class: 1st year
Date: /5/2016

Notes// 1. Please read the questions carefully, 2. Answer all question

Windows

Q1: Choose the correct answer for the following sentences?

1. Personal computers can be connected together to form a
a. Server b. Network c. Supercomputer d. Enterprise
2. Choose the smallest memory size
a. Kilobyte b. Megabyte c. Gigabyte d. Terabyte
3. The steps and tasks needed to process data, such as responses to questions or clicking an icon, are called:
a. Instructions b. Operating system c. Application software d. System unit
4. The operating system is the most common type of _____ software.
a. System b. Communication c. Application d. Word-processing
5. Computer software includes
a. Packaged programs b. Application programs c. Operating system programs
d. All of these
6. The Operating System Manages
a. Processes b. Memory c. Disks and I/O devices d. All of the above
7. What are the four things needed to connect to the Internet?
a. Monitor, keyboard, mouse, modem
b. Telephone line, PDA, modem and computer
c. Telephone line, modem, computer, and an ISP
d. Modem, computer, PDA and ISP

- Q2: How can you change the background of the desktop? (14 degree)
(6 degree)
- Q3: How can you remove program from the windows system? (7 degree)
- Q4: How can you add printer to your computer? (8 degree)
- Q5: How can you change the margins of the page (1cm from all sides)?
(8 degree)
- Q6: How can you search file in your computer ? (7 degree)

♣♣ Good Luck ♣♣

Dr. Eng. Mahdi Hatf Kadhum
Examiner

MS Dos, hardware and software

Q7/ Answer the following: (15M)(Choose five only)

- 1) What is the major limitation of RAM?*
- 2) What is the Allocation Unit?*
- 3) How the leaser image printed to the paper by laser printer?*
- 4) What is the bios?*
- 5) What is the Modem? And what are its functions?*
- 6) What are kind of storage in computers?*

Q8/ Write the following commands (15M) (Choose five only)

- 1. Remove Directory Techcollege*
- 2. Delete all file except Techcollege*
- 3. Change Directory AlNajaf*
- 4. Make DirectoryAli*
- 5. Copy all file in drive (c) to drive (d)*
- 6. Delete all the file*
- 7. Move the file Ali from directory Ahmed to directory Amjed*

Q9/ Give the full terms of the following abbreviations: (20M)

- | | |
|------------------|------------------|
| <i>1) CPU</i> | <i>2) PPM</i> |
| <i>3) OCR</i> | <i>4) CD-ROM</i> |
| <i>5) Pixels</i> | <i>6) DVD</i> |
| <i>7) LCD</i> | <i>8) DOS</i> |
| <i>9) MP</i> | <i>10) FAT</i> |

With my best wishes

Lecture

Basil Noori Merzah

Head of department

Dr. Haider Hassan

قسم السيارات
١٧٥

القسم : هندسة تقنيات السيارات
المرحلة : الاولى
المادة: دوائر كهربائية
زمن الامتحان: ثلاث ساعات
التاريخ: 2016/06/



جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

الامتحانات النهائية (الدور الاول) - العام الدراسي 2015/2016

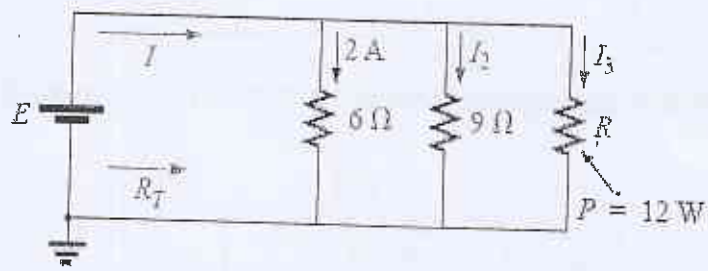
Note: Answer all questions

Q1/Answer (a) or (b)

(a) Find E , I , I_2 , I_3 and R for the circuit of Fig.(1) using the information provided.

(20 marks)

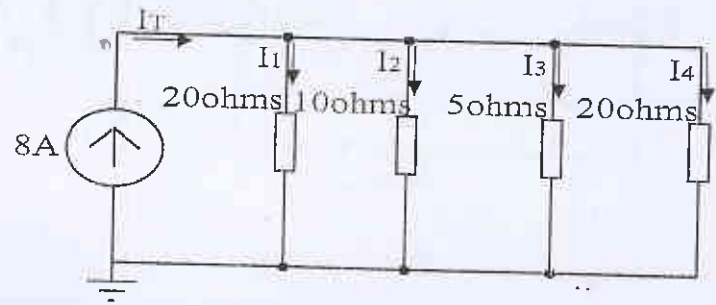
Fig.1



(b) Determine all currents and voltages in the circuit of the figure shown in fig.(2).

(20 marks)

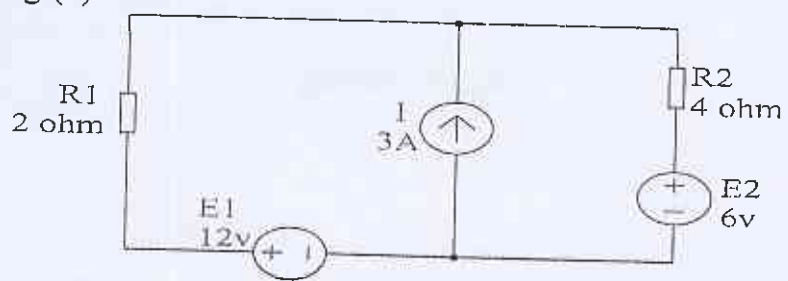
Fig.2



Q2/Using the superposition theorem, find the current through the 2-ohm resistor of the network shown in fig.(3).

(20 marks)

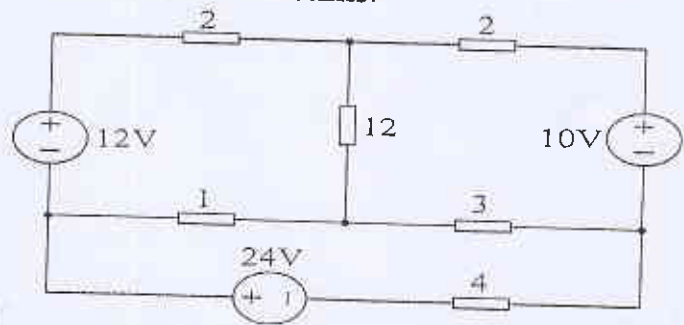
Fig.3



Q3/Determine the current in the (4-ohms) for the circuit shown in fig.(4), using loop current method. All resistor values are in ohms.

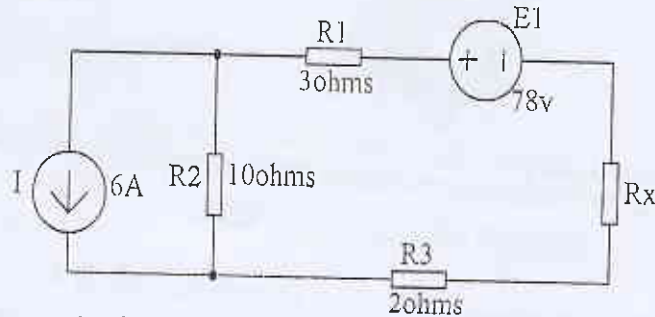
(20 marks)

Fig.4



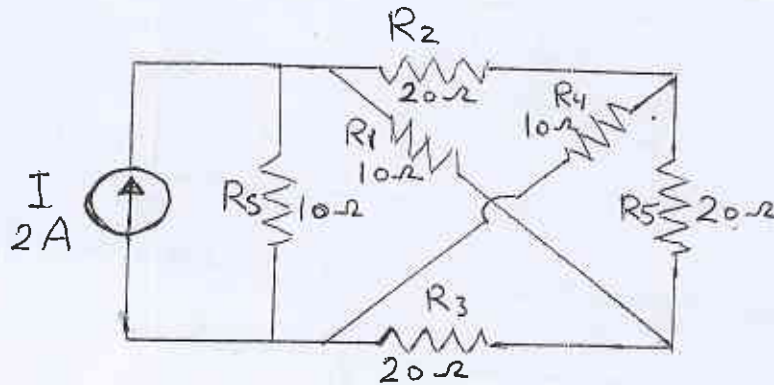
Q4/Find the value of R_x in the network shown in fig.(5), for maximum power to R_x and determine the maximum power. (20 marks)

Fig.5



Q5/ For the network shown in fig.(6), write the nodal equations and solve for the nodal voltages. (20 marks)

Fig.6



GOOD LUCK

Head of department
H. ALABDILI



Examiner
I. ALSHIMAYSAWI

المادة: المرحلة : ا لاولى
الوقت : ثلاث ساعات
مدرس المادة : م.م. بسام عبد الصاحب

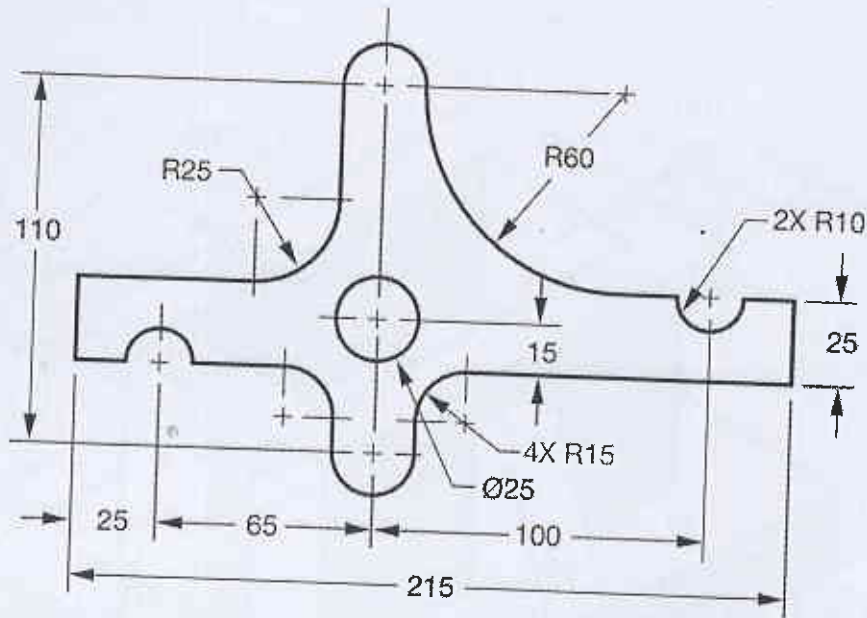


وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية الهندسة النجف

امتحان الرسم الهندسي
امتحان النهائي الدور الاول 2015-2016

30 درجة

س1: ارسم الشكل ادناه



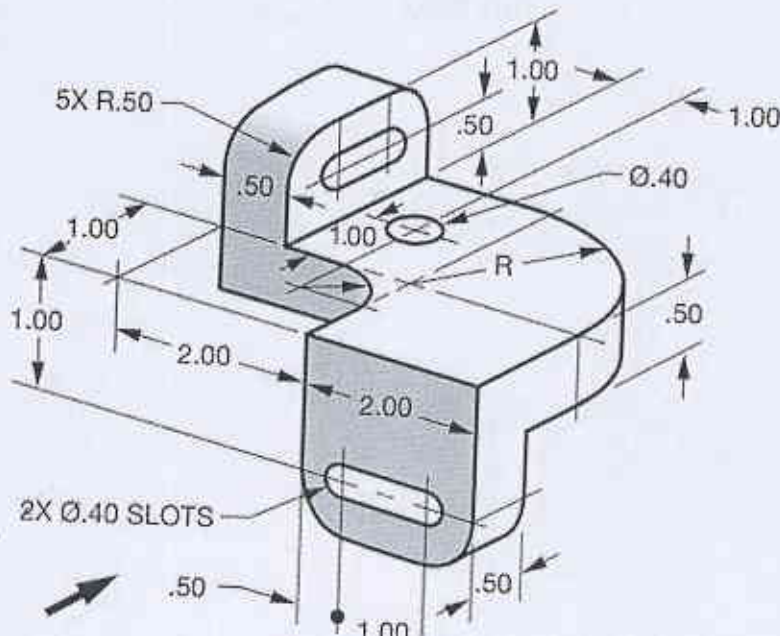
س2: ارسم المقطع الامامي مقطوع

مسقط جانبي

مسقط افقي

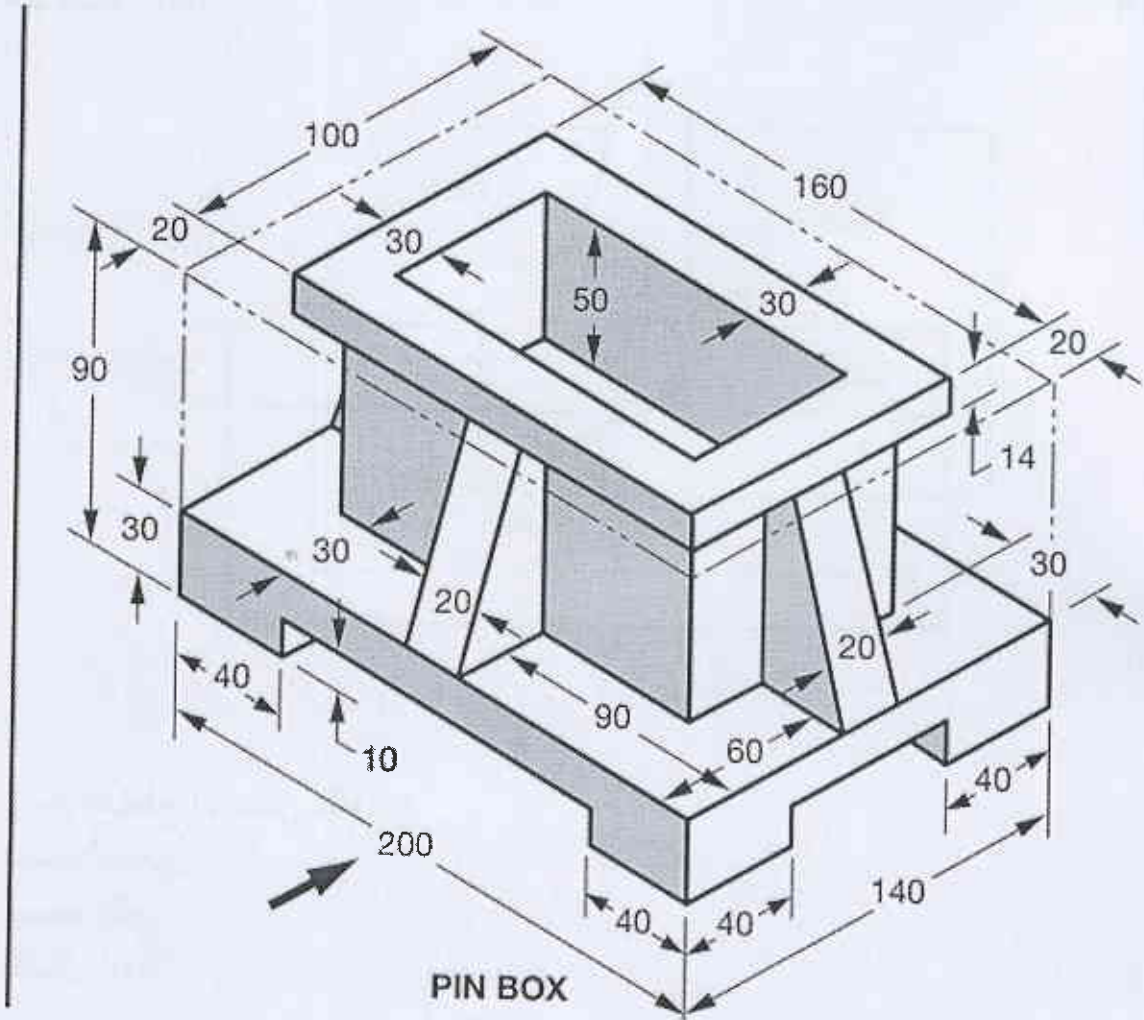
للكل شكل ادناه

35 درجة



35 درجة

س3: ارسم الشكل ادناه رسم مجسم بطريقة (Isometric)



Technical College of Najaf

Subject: Automotive Materials

Automotive Department

Class: 1nd Stage

Examiner: Oraskhudayer

Second Attempt (2015-2016)

Time :hrs

.....

Q1/(A) Explain fully what is meant by the term **growth** as applied to cast irons Discuss methods which are used to overcome this phenomena ?(15 D)

(B) Cast iron is a cheap , easily produced engineering material , but ordinary grey cast iron has relatively poor mechanical properties , Discuss in general terms , the methods employed to overcome these limitations ? (15D)

.....

Q2/ Give the approximate composition of alloy steel which would be suitable for any four of the following : (a) a rustless kitchen sink unit. (b) an auto engine connecting rod . (c) the lip of a dredger bucket . (d) a rustless fruit knife blade . (25 D)

.....

Q3/ (A) Define the Impact tests?(10 D)

(B) Show the force- extension diagram of a carbon steel ?(10 D)

.....

Q4/(A) Compare forging and casting as processes of production ; with especial reference to metallurgical effects ? (15 D)

(B) Write notes on the following : (1) extrusion . (2) forging . (3) rolling . (4) wire-drawing ? (10 D)

.....

اربعين بلون ساجات ، الدعوات لهما من فائدة حقوق متميز
 من اوله اوله (ب) الأباية عما أربعة اشكبه تقط و عندته ان
 من الأباية عما اهدا الفرحين ٢ - تخنارت و ادوية الرافدين ليماء و
 على فكر حقوق الانسان كهدية عما هذا الموضوع و بأسها
 ب - عدد اسم انوار الحرياء العامة ثم شرح هريه النعم و خزيه الفكر
 س ما ذا نفسي بوجهات الديمقراطية اشرفها و بالتفصيل (هـ)
 س عرف الديمقراطية تعريفياً شافلاً ثم عدد انواعها انواعها
 س للديانة الاسلاميه اثر واضح من الارتقاء في فكر حقوق
 الانسان (ب) اجه عن اهدا النوعين
 س ايها هو العناصر الاسلاميه للديمقراطية (هـ)
 ب . عرف حقوق الانسان تعريفياً
 شاملاً ثم بين اهم الخصائص والصفات

د توبه الارض

قسم التغييرات
 ١٥١

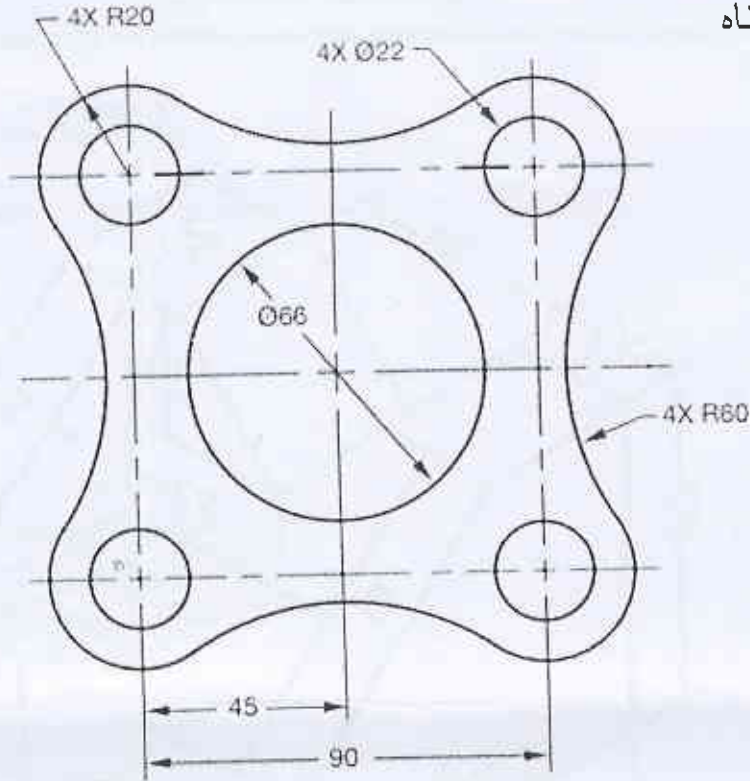


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امتحان الرسم الهندسي
امتحان النهائي الدور الاول 2015-2016

30 درجة

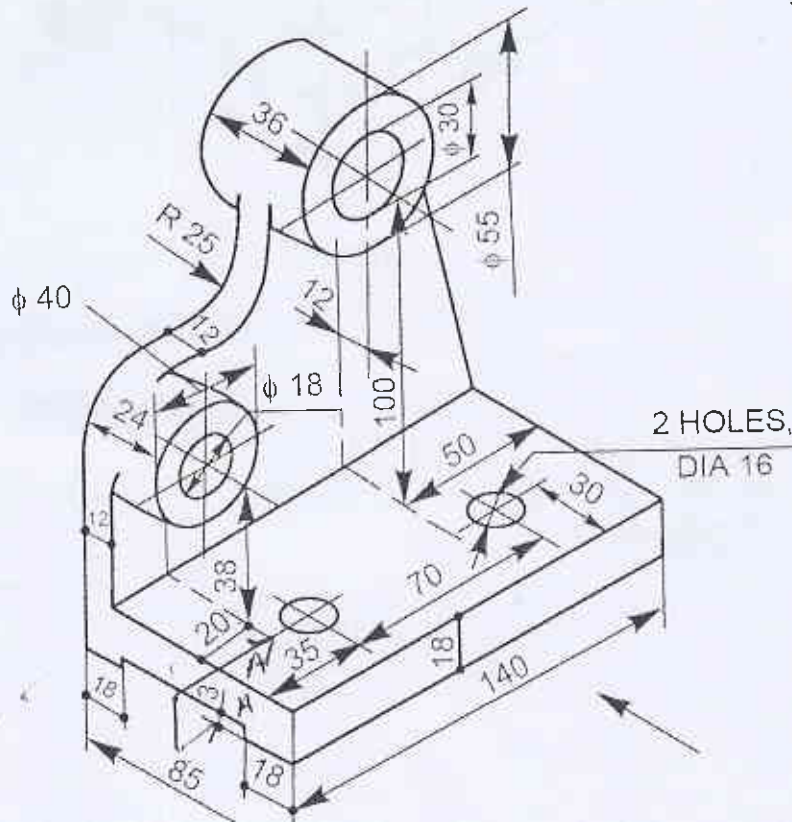
س1: ارسم الشكل ادناه



س2: ارسم المقطع الامامي مقطوع A-A

مسقط جانبي
مسقط افقي
للكل شكل ادناه

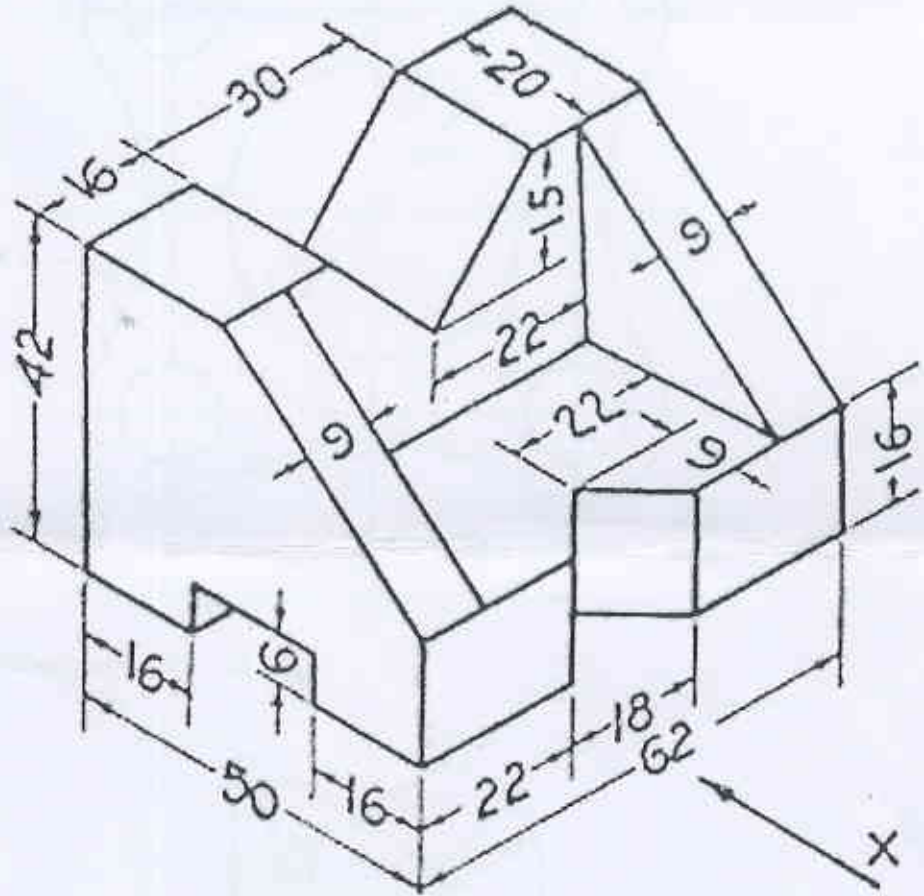
35 درجة



077220

35 درجة

س3: ارسم الشكل ادناه رسم مجسم بطريقة (Isometric)



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مرحمة المارح

قسم الرياضيات
١١/١١

Ministry of Higher Education and Scientific Research
Al-Furat Al-Awsat Technical University
Tech. Eng. College – Najaf/Automobile Tech. Eng. Dept.
Final examination 2016



Subject: Mathematics
Time: 3 hours

Class: 1st year.
Date: / / 2016.

Note// Answer all question.

Q1):

A) Find the area bounded by the curves: (20 marks)

$$x = -y^2 + 10 \quad \text{and} \quad x = (y - 2)^2$$

B) Assume:

$$A = \begin{bmatrix} 3 & 2 & 5 \\ 2 & -1 & 4 \\ 5 & 4 & 0 \end{bmatrix}$$

Show that: A is symmetric matrix.

Q2) Evaluate five of the following integrals:

(20 marks)

1. $\int \sqrt{(z^2 - z^{-2})^2 + 4} \, dz$

2. $\int \tan(3x + 5) \, dx$

3. $\int \frac{e^t}{1 + e^{2t}} \, dt$

4. $\int \frac{1}{x\sqrt{4x^2 - 1}} \, dx$

5. $\int \frac{\sinh(x)}{\cosh^4(x)} \, dx$

6. $\int e^{\sinh(x)} \cosh(x) \, dx$

Q3) Prove that:

(20 marks)

1. $\int e^{ax} \sin(bx) \, dx = \frac{e^{ax}}{a^2 + b^2} [a \sin(bx) - b \cos(bx)] + c$

2. $\int x \cos(x) \, dx = x \sin(x) + \cos(x) + c$

3. $\int \sin^3(x) \, dx = -\cos(x) + \frac{1}{3} \cos^3(x) + c$

4. $\int \cos^4(\theta) \, d\theta = \frac{3}{8} \theta + \frac{1}{4} \sin(2\theta) + \frac{1}{32} \sin(4\theta) + c$

Ministry of Higher Education and Scientific Research
Al-Furat Al-Awsat Technical University
Tech. Eng. College – Najaf/Automobile Tech. Eng. Dept.
Final examination 2016



Subject: Mathematics
Time: 3 hours

Class: 1st year.
Date: / / 2016.

Note// Answer all question.

Q4) Differentiate four of the following with respect to x and find $\frac{dy}{dx}$: (20 marks)

1. $\sin(y) + x^2 + 4y = \cos(x)$
2. $3xy^2 + \cos(y^2) = 2x^3 + 5$
3. $5x^2 - x^3 \sin(y) + 5xy = 10$
4. $x - \cos(x^2) + \frac{y^2}{x} + 3x^5 = 4x^3$
5. $\tan(5y) - y \sin(x) + 3xy^2 = 9$

Q5):

(20 marks)

- A) Prove that the differentiation of the function $f(x) = \frac{\cos(x)}{1 - \sin(x)}$ is $f(x)' = -\frac{1}{(1 + \sin(x))}$
- B) Prove that the differentiation of the function $f(x) = \sin(x)$ is $f(x)' = \cos(x)$

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