



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 الأول

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. Which one of these (A, B, C, D) is the correct answer? Please read carefully? (20%)

1. In an isolated system there is:

- A. no mass transfer. B. energy transfer
 C. neither mass nor energy transfer D. both mass and energy transfer

2. The atmospheric pressure is highly dependent on:

- A. mass B. volume C. temperature D. elevation

3. The specific latent heat of vaporization (h_{fg}) of a substance increases as:

	Temperature	Pressure
A.	constant	increase
B.	increase	constant
C.	increase	increase
D.	decrease	decrease

4. Estimate the maximum power output of an engine operating between 600°C and 20°C if the heat input is 100 kJ/s .

- A. 83.3 kW B. 77.3 kW C. 66.4 kW D. 57.3 kW

5. For an ideal gas, according to Charles law of gases:

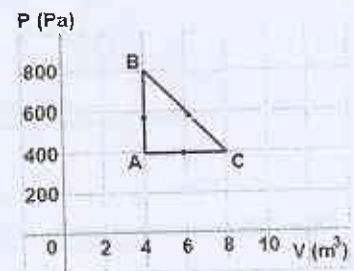
- A. $p \cdot v = \text{constant}$, if T is kept constant. B. $p/T = \text{constant}$, if v is kept constant
 C. $v/T = \text{constant}$, if p is kept constant. D. $T/p = \text{constant}$, if v is kept constant.

6. Estimate the enthalpy of steam at 600°C and 2 MPa :

- A. 2931 kJ/kg B. 3957 kJ/kg C. 2972 kJ/kg D. 3690.7 kJ/kg

7. An ideal gas is taken through a closed path $A \rightarrow B \rightarrow C \rightarrow A$. The work done during the change of state from A to B is:

- A. zero
 B. 1.6 kJ
 C. 0.8 kJ
 D. 2.4 kJ



8. Estimate the entropy of steam at $T=220^\circ\text{C}$, and $P=5000 \text{ kPa}$:

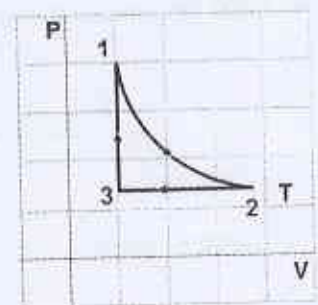
- A. 2.9518 kJ/kg B. 3.2725 kJ/kg C. 2.5127 kJ/kg D. 2.7654 kJ/kg

9. Which of the following is not a thermodynamic property?

- A. pressure B. temperature. C. heat D. specific volume

10. A sample of an ideal gas taken through a closed cycle is presented by the P-V diagram. The process 1-2 is perfectly isothermal. Which of the following is true about the change in internal energy and work done by the gas during the process 1-2?

- A. $\Delta U = 0$ $W_{\text{by the gas}} > 0$
 B. $\Delta U > 0$ $W_{\text{by the gas}} = 0$
 C. $\Delta U < 0$ $W_{\text{by the gas}} < 0$
 D. $\Delta U = 0$ $W_{\text{by the gas}} = 0$





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

**Q2. ** The pressure of steam inside a boiler is recorded by a pressure gauge as 1.2 N/mm^2 . If the barometer reads the atmospheric pressure as 770 mm of Hg, find the absolute pressure of steam inside the boiler in N/m^2 , kPa and bar. (15%)

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

A) $W_m = m(h_2 - h_1)$ [For input power of compressor]

B) $C_p - C_v = R$ [For an ideal gas]

C) $\Delta S = C_p \ln\left(\frac{T_2}{T_1}\right) - R \ln\frac{P_2}{P_1}$ For an ideal gas during constant pressure process]

D) $\eta_{\text{carnot}} = 1 - \left(\frac{T_L}{T_H}\right)$ [For simple Carnot cycle]

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

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

T (°C)	P (kpa)	u (kJ/kg)	Phase Description
-38			Saturated liquid
	8.0	94.79	
65			Saturated vapor
110	320		
	2500	186.99	

**B ** One kilogram of steam with a quality of 20 percent is heated at a constant pressure of 200 kPa until the temperature reaches 400°C. Calculate the work done by the steam.

**C ** Calculate the work necessary to compress air in an insulated cylinder from a volume of 2 m³ to a volume of 0.2 m³. The initial temperature and pressure are 20°C and 200 kPa, respectively.



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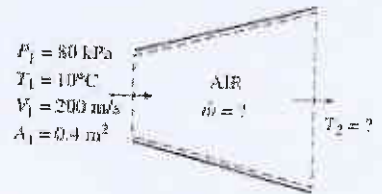
Notes// 1. Please read the questions carefully, 2. Answer all questions

Q5. \ \ Answer only Two branches:

(20%)

**A\ ** A cylinder is initially filled with saturated water vapor (1.2 kg) at 200°C, Heat is transferred to the steam and it expands isothermally until pressure reaches (800 kpa) ,Determine the heat transfer and the work output for the process.

**B\ ** 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.



**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 Carnot heat engine, receives 500 kJ of heat per cycle from a high-temperature source at 652°C and rejects heat to a low-temperature sink at 30°C. Determine (a) the thermal efficiency of this Carnot engine and (b) the amount of heat rejected to the sink per cycle. (10%)

With Best Wishes

Lecture/Salah M.S.

Head of Dept

مدير الامتحان
✓

Technical College of Najaf

Subject: Automotive Materials

Automotive Department

Class: 1st Stage

.. Examiner: Oraskhudayer

First Attempt (2015-2016)

Time : hrs

.....
Q1/(A) Compare the Cu-Zn and Cu-Ni ranges of alloys from the following aspects where applicable : (a) effects of additional alloying elements , (b) typical compositions and uses , (c) effect of heat treatment .? (6 D)

(B) Discuss the reasons why copper-base alloys have tended to be replaced by other materials during the past twenty years ago or so ? (5 D)

(C) Describe the effects of alloying on the following properties with respect to copper :

(a) electrical conductivity , (b) machinability , (c) formability , (d) corrosion – resistance (e) mechanical strength ? (10 D)

(D) Write an account of the ways in which the properties of copper may be made suitable for particular industrial applications by the addition of small amounts of an alloying element , Indicate the composition , condition and an appropriate application for all types of copper ? (9 D)

Ⓐ Choose one only.....

Q2/A number of alloys of copper are called (bronzes) .Give the slandered composition , properties and a suitable application for each of four (bronzes) containing different principle alloying elements other than tin ? (20D)

Ⓑ Define the impact test ? (20D)

Ⓐ Choose one only

Q3/ What are the important physical properties of metals and alloys?(25 D)

Ⓑ Show the force-extension diagram of a carbon steel (25)

Q4/Define the following terms : (1) toughness. (2) hardness. (3) tensile strength .

(4) ductility . Describe briefly the tests you would employ to measure these properties?

(25 D)

OR

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):

(20 marks)

A) Find the area bounded by the curves:

$y = x^2$ and $y = \sqrt{x}$

B) Assume:

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

Show that: $(A + B)' = A' + B'$

Q2) Evaluate five of the following integrals:

(20 marks)

1. $\int \frac{x+3}{\sqrt{x^2+6x}} dx$

2. $\int \tan^3(x) dx$

3. $\int \frac{y}{y^4+1} dy$

4. $\int \frac{1}{x \ln x} dx$

5. $\int e^{2x} \cosh(e^{2x}) dx$

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

Q3) Prove that:

(20 marks)

1- $\int x^3 e^{\frac{x}{2}} dx = e^{\frac{x}{2}} (2x^3 - 12x^2 + 48x - 96) + c$

2- $\int x \sec^2(x) dx = x \tan(x) + \ln |\cos(x)| + c$

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

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

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):

(40 marks)

A) Find the n^{th} order derivative of the sine function $y = \sin(x)$?

B) Find $\frac{dy}{dx}$ for *two* of the following functions:

1. $y = \sin^{-1}\left(\frac{5x}{6}\right)$


2. $y = \left(\frac{\csc(x)}{\sqrt{x}}\right)$


3. $x = 1 + y^{-3}$

C) Find dy for one of the following functions:

1. $y = \frac{(x^4 - 2)^3}{5x - 1}$

2. $y = \left(\frac{1}{x^2 + x} + 1\right)^2$


د. محمد عبد الله


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د. محمد عبد الله

المادة: المرحلة :1 ا لاولى
الوقت : ثلاث ساعات
مدرس المادة :م.م. بسام عبد الصاحب

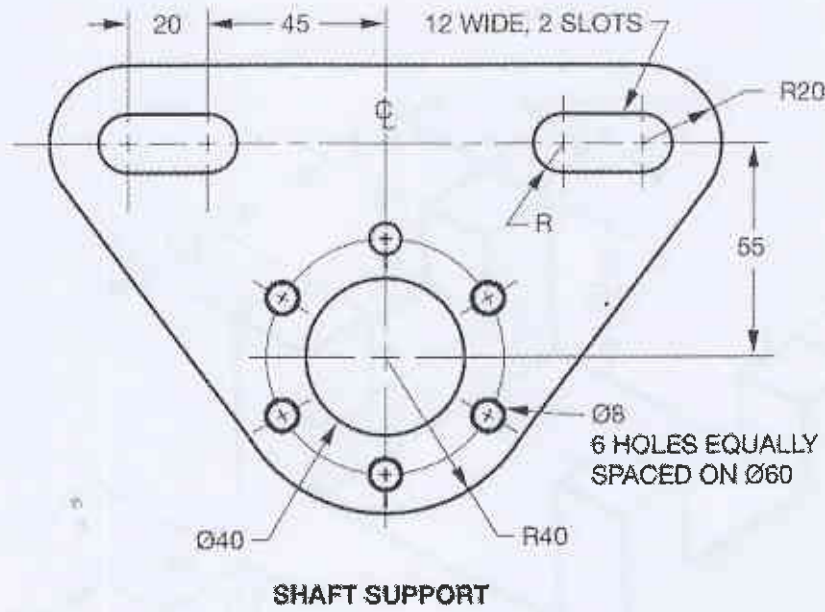


وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية الهندسة النجف

امتحان الرسم الهندسي
امتحان النهائي الدور الاول 2015-2016

30 درجة

س1: ارسم الشكل ادناه



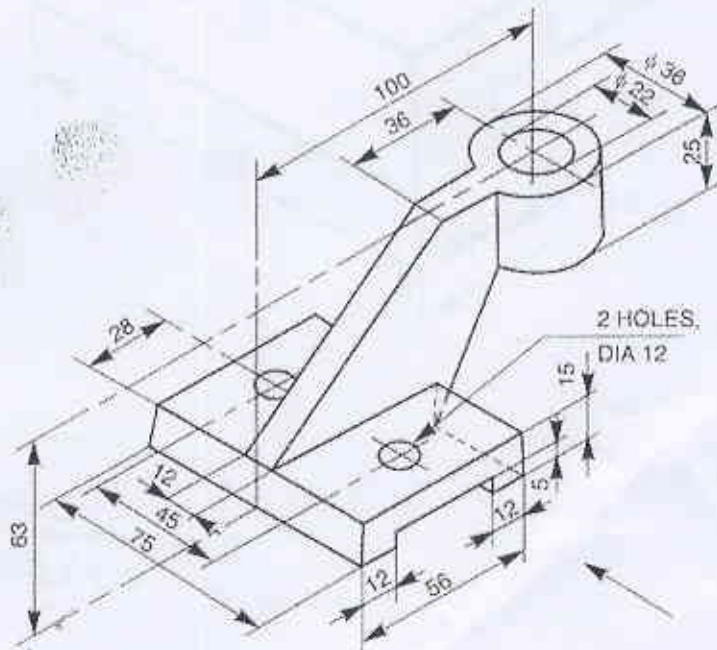
س2: ارسم المقطع الامامي مقطوع

مسقط جانبي

مسقط افقي

للشكل ادناه

35 درجة



المرحلة الأولى

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 الطيران

الدور الاول 2015-2016

Note: Answer all questions.

Q1) Determine the magnitude of the force acting along the axis of each of three struts needed to support the 900kg block as shown in Figure 1. (20 degree)

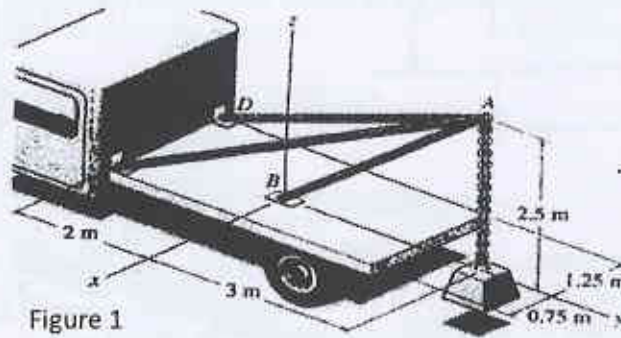


Figure 1

Q2) For the Figure 2 below, determine the force on all members for two of the structures a, b, and c. (20 degree)

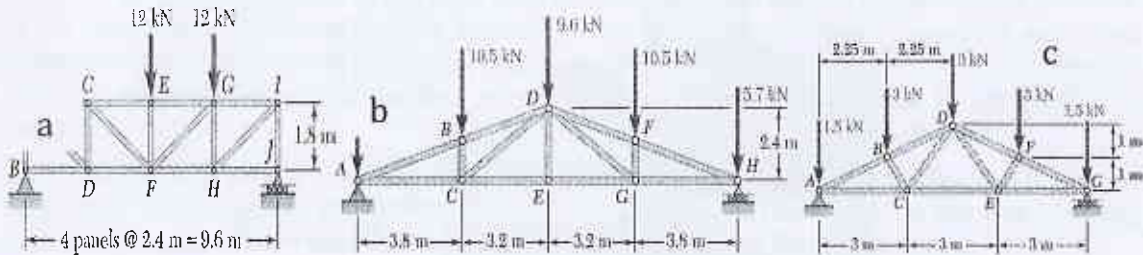


Figure 2 (a, b, c)

Q3) The coefficients of friction are $\mu_s = 0.40$ and $\mu_k = 0.30$ between all surfaces of contact in Figure 3. Determine the smallest force P required to start the 30-kg block moving if cable AB (a) is attached as shown, (b) is removed (c) if the ground surface was inclined by 20° . (20 degree)

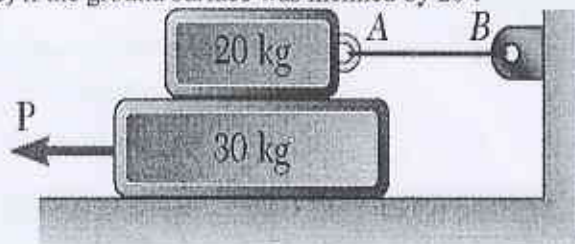


Figure 3



Q4) For the Figure 4 below, find the centroid and determine the moment of inertia about x, y axis for both shapes. (20 degree)

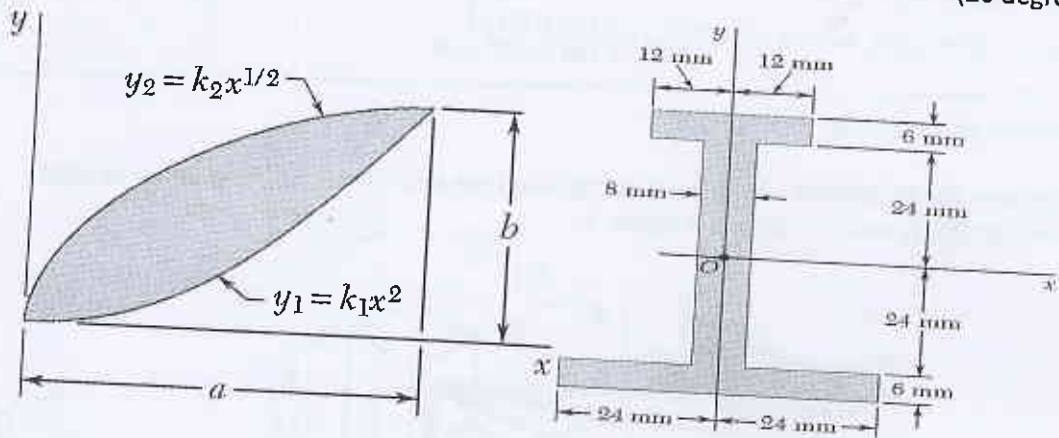


Figure 4

Q5) Block A supports a pipe column and rests as shown on wedge B in Figure 5. The coefficient of static friction at all surfaces of contact is 0.25. If $P = 0$, determine (a) the angle θ for which sliding is impending, (b) the corresponding force exerted on the block by the vertical wall.

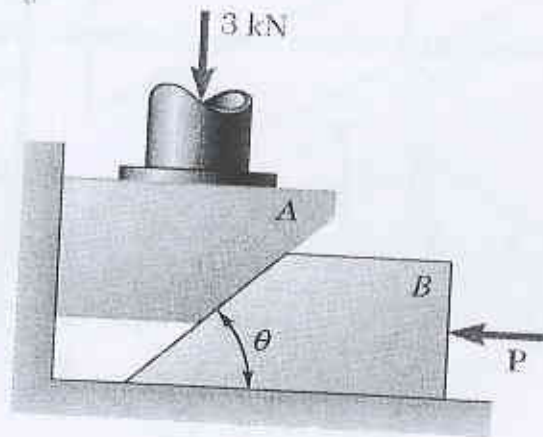


Figure 5

[Signature]
Lecturer

Dr. Hyder H. Balla

[Signature]
Head of Department
Ass. Prof. Dr. Ali Shaker





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?
- All of the following are examples of input devices except:
a. Scanner b. Mouse c. Printer d. Keyboard
 - All of the following are examples of real security and privacy risks except:
a. Viruses b. Identity theft c. Hackers d. Spam
 - Which of the following is an input device?
a. Mouse b. Keyboard c. Scanner d. All the above
 - The set of instructions that tells the computer what to do is
a. Softcopy b. Software c. Hardware d. Hardcopy
 - Which of the following stores more data?
a. DVD b. CD ROM c. Floppy Disk d. CD RW
 - is the heart of the computer and this is where all the computing is done.
a. Keyboard b. Monitor c. Central Processing Unit d. Printer
 - To move forward through the tabs
a. CTRL+TAB b. CTRL+SHIFT+TAB c. SHIFT+TAB d. None of these
- Q2: How can you restore the delete file from Recycle Bin? (14 degree)
(6 degree)
- Q3: Write the types of connection for any device with your computer? (8 degree)
- Q4: How can you make the file in computer is hidden? (7 degree)
- Q5: How can you insert picture in the word program? (5 degree)
- Q6: Write the stages of the format and installing the windows on the computer ? (10 degree)

♣♣ Good Luck ♣♣


Dr. Eng. Mahdi Hatf Kadhum
Examiner

MS Dos, hardware and software

Q7/ Give the full terms of the following abbreviations: (20M)

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

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 Directory Ali
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/ What the difference between: (15M)

1. The hardware and software
2. RAM and ROM
3. Windows and Ms-Dos
4. Hard disc and CD
5. Minicomputer and Mainframe computers.

With my best wishes


Lecture

Basil Noori Merzah



Head of department
Dr. Haider Hassan

قسم السيارات
١١٨٢

الإجابة عن أربعة أسئلة فقط

س (١) أحب عن أحد الفرعين:

١- عرف الديمقراطية تعريفًا شاملاً ثم بين أهم العناصر الأساسية للديمقراطية.

ب- تحدث عن الاتفاقية الأمريكية لحقوق الإنسان. بماذا تميزت وهل طبقت الاتفاقية على أرض الواقع.

س (٢) الديانة الإسلامية جعلت الإنسان المحور المركزي للمسيرة الإنسانية. ناقش ذلك.

س (٣) أحب عن أحد الفرعين:

١- عرف حقوق الإنسان تعريفاً شاملاً وما أهم الخصائص والأجيال.

ب- للحريات العامة أنواع عددها وأشرح ما يخص العملية التعليمية.

س (٤) م أهم مصادر تمويل اللجنة الدولية للصليب الأحمر الدولي وما أهم أعمال اللجنة الدولية للصليب الأحمر الدولي.

س (٥) لمناظرات حقوق الإنسان أهمية خاصة في فهم مادة حقوق الإنسان عددها وأشرح اثنتين منها.



Note: Answer only 4(Four) questions

Q1/Determine I and V in the circuit shown in below :

(20 mark)

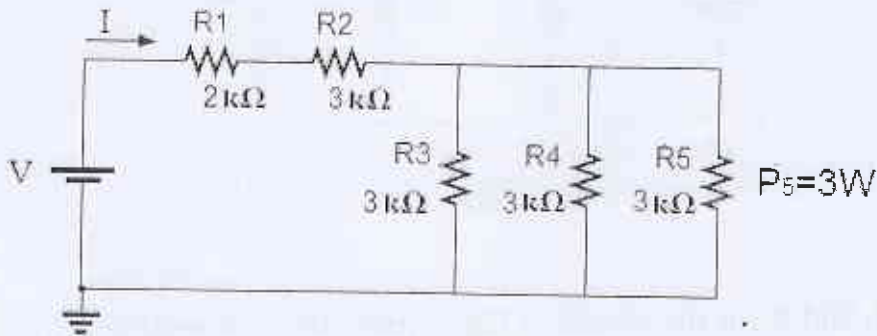


Fig.1

Q2/By using Kirchhoff's Voltage law determine V_{x1} and V_{x2} for the network in Fig.2

(25 mark)

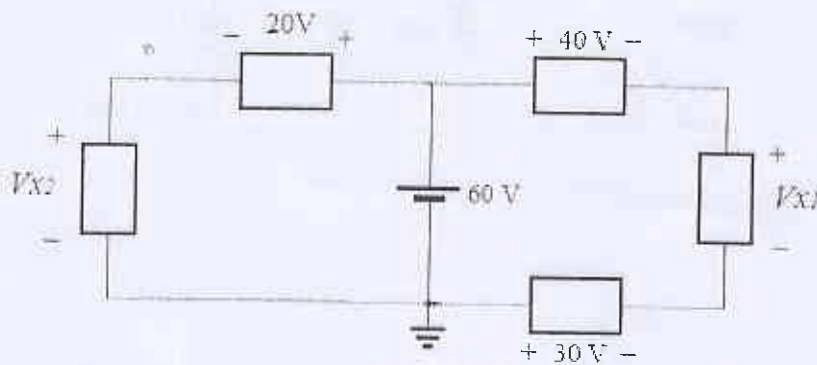


Fig.2

Q3/By using Kirchhoff's current law ,Find the magnitude and direction of the currents I_1 , I_2 , and I_3 for the network of Fig. 3.

(25 mark)

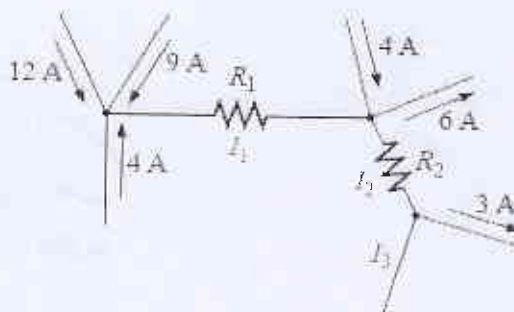


Fig.3

Q4/Using the information provided in Fig. 4, find the branch resistors R_1 and R_3 , the total resistance R_T , and the voltage source E . (25 mark)

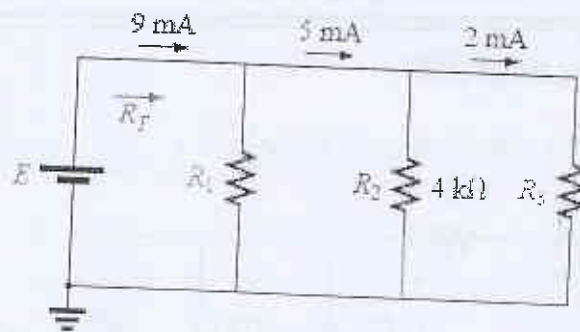


Fig.4

Q5/Find E , I , I_2 , I_3 and R for the circuit of Fig. 5 using the information provided. (25 mark)

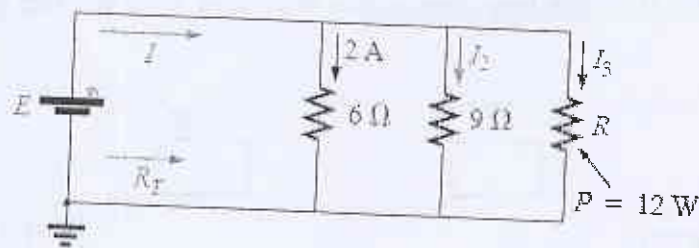


Fig.5

رئيس القسم : د حيدر حسن

مدرس المادة: احسان عبد الكريم