

Tanta University

Physics and Mathematical Eng. Department

Faculty of Engineering

Course Title	Math 1(a)	Academic Year		
Year/ Level	Preparatory Year	2021/2022	Course Code	PME0101
		First-Semester Exam		
Date	24 - 1 - 2022	No. of Pages (3)	Allowed time	3 hrs

Answer the following questions

Part (A)

Question Number (1)

(25 Points)

- a) Write the first four terms of the expansion of the function: (6 marks)
 - $f(x) = (4 + x)^{-3}$; $x \gg$. Find the condition of convergence of this expansion.
- b) Consider the Chebychev polynomials defined by the relations (7 marks) $T_0(x) = 1$, $T_1(x) = x$, and $T_{n+1}(x) = 2xT_n(x) T_{n-1}(x)$. Use the extended mathematical induction principle to prove that: $T_n(x) = \cos(n\cos^{-1}x)$.
- c) Use the secant method to estimate the root of $f(x) = e^{-x} x$. (6 marks) Start with the initial values $x_0 = 0$, $x_1 = 1$. Two iterations are sufficient.
- d) Find the eigenvalues and eigenvectors of the matrix $\begin{bmatrix} 1 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 1 \end{bmatrix}$. (6 marks)

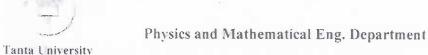
Question Number (2)

(25 Points)

- 2-a) Determinant whether or not the following set of vectors in \mathbb{R}^3 are linearly dependent: (1, -2, 1), (2, 1, -1), (7, -4, 1). (6 marks)
- 2-b) Analyse the fraction $\frac{4x^3 + 10x + 4}{x(2x+1)}$ into its partial fractions. (6 marks)
- 2-c) Use the elementary matrices to put the matrix $A = \begin{pmatrix} 2 & 1 & 1 \\ 4 & 1 & 0 \\ -2 & 2 & 1 \end{pmatrix}$ in the form
 - A = LU. Then solve the system of equations $Ax = \begin{pmatrix} 1 \\ -2 \\ 7 \end{pmatrix}$. (6 marks)
- 2-d) If two roots of the equation $x^4 + 6x^3 + ax^2 + bx + 36 = 0$ are real and equal twice the other two roots. Solve the equation and evaluate a & b.

(7 marks)

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Faculty of Engineering

Part (B)

Question Number (1) Choose the correct answer: (20 Points)

- Suppose that $f(x) = \ln x$ and $g(x) = 9 x^2$. The domain of f(g(x)) is
 - (a) |x| > 3 (b) $|x| \le 3$ (c) $x \le 3$ (d) |x| < 3
- (2) The inverse of the function $f(x) = log_3(x-2)$. equal to:
 - (a) R/2 (b) $3^x 2$ (c) $3^x + 2$ (d) $log_3(x-2)^{-1}$
- (3) If $9e^{3t} = 27$, then the value of t equal to:

(a)
$$\frac{\ln 27}{27}$$
 (b) $\ln \sqrt[3]{3}$ (c) $\ln 3$ (d) 1

(4) Which of the following is an odd function

(a)
$$y = sinx$$
 (b) $y = x^3 + 1$ (c) $y = lnx$ (d) $y = cos^2 x$

(5) The slope of the line normal to the curve $f(x) = 2\cos 4x$ at the point $x = \frac{\pi}{12}$ equal to:

(a)
$$\frac{\sqrt{3}}{12}$$
 (b) -4 (c) $4\sqrt{3}$ (d) $\frac{1}{4}$

(6) Given the function $f(x) = e^{\frac{x}{2}}$ on the closed interval [1, 4]. If e is the number guaranteed by the mean value theorem, then e (corrected to three decimal places) is approximately

- (a) 1.163 (b) 1.996 (c) 0.978 (d) 2.065
- (7) The limit of the function $\lim_{x\to 0} \frac{\cos 3x 1}{x}$ equal to:

(a) 3 (b)
$$-1$$
 (c) 0 (d) 1

(8) The function $f(x) = x^3 - 2x^2$, is increasing on which of the following intervals:

(a)
$$x = 0$$
 only (b) $x > \frac{4}{3}$ only (c) $0 < x < \frac{4}{3}$ (d) $x < 0$ or $x > \frac{4}{3}$

(9) If $f(x) = x^3 \ln x$ then $\frac{df}{dx}$ equal to:

(a)
$$x^2 \ln x + x^2$$
 (b) $3x^2 \ln x$ (c) $(3x^2 + 1) \ln x$ (d) $(3 \ln x + 1) x^2$ (10) If $f(x) = \ln(\ln x)$, then $(f)'(e)$ equal to:

(a) (b)
$$e$$
 (c) $\frac{1}{e}$ (d) 1



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Question Number (2)

(30 Points)

(1) If $y = e^{4x} + 2e^{-x}$ Prove that y''' - 13y' - 12y = 0

(4 Points)

(2) Evaluate the following limits:

(i) $\lim_{x \to \infty} \left(\frac{3x-4}{3x+2}\right)^{\frac{x+1}{3}}$ (ii) $\lim_{x \to \frac{\pi}{4}} \frac{\cos x - \sin x}{\frac{\pi}{4} - x}$ (iii) $\lim_{x \to 1} \left(\frac{x}{x-1} - \frac{1}{\ln x}\right)$

(6 Points)

(3) Find y' when:

(10 Points)

 $y = \sqrt{\tan\sqrt{x} + x^{x^2} + 5^{\sin^{-1}2x}}$

 $y = \sin \tanh \left(\ln \sqrt{\frac{1+x}{1-x}} \right)$

 $csh(x+y) + 5^{xy} = ln(x^y)$ (iii)

(4) Prove that the function $f(x) = x^2 - 2x + 3$.

(4 points)

 $g(x) = x^3 - 7x^2 + 20x - 5$ satisfy the conditions of Cauchy theorem in the interval [1, 4] and find the corresponding value of c

(5) Find the equations of the tangent and the normal lines and length

(6 Points)

of tangent, normal, under tangent and under normal for the curve

 $y = 4x^3 - 3xy^2 + 6x^2 - 5xy - 8y^2 + 9x + 14$ at the point (-2, 3).

End of questions.....

With best wishes

Dr. A. E. Shalaby

Dr. F. R. Mousa

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Consputers and Automatic Control Fig. Marks: 60 Marks



Course Title: Computer Technology
Date: 3-2-2022 Course Code: CCE0101 Year: Preparate hysical

ate	e: 3-2-2022	Allowed ti	me: 3 hrs.		Model: A	
).1) Choose the correct answer:	(1	Q1+Q2	50 Marks	s)	
	1.1) computer is a form of					VS
hen	nomena.					,
	A) A Digital B) An	analog -	C) A Hyb	rid		
	1.2) Which of the following is the mo	ost powerful ty	pe of compu	iters?		
	A) Super conductor B) Mi	crocomputer	C) Super	computer	D) Mainframe	
	1.3) It is specified as a main memory					
	A) Hard disk B) Cl		C) RAM		D) Floppy disk	
	1.4) Multi-programmed Batch System					
	A) decreases CPU utilization	1	C) increas	es CPU uti	ilization	
	B) decreases RAM utilization	on	D) increas	es RAM u	tilization	
	1.5) Which one of the following is an	application so	ftware packa	age?		
	A) Windows B) Red		C) Micros	oft Office	D) All the above	
	1.6) The input device to the computer					
	A) a mouse B) touch s	creen	C) a keybo	ard	D) all the above	
	1.7) The mail server for the E-mail ac		d@gmail.com	n is:		
	A) gmail B) ahn		C) gmail.c	om	D) ahmed@gmail.com	
	1.8) A user can make any change in th					
	A) Interactive computer graphiB) Non-Interactive computer g	cs	C) Both (A	A) & (B)		
	B) Non-Interactive computer g	raphics	D) None o	f the above	e	
	1.9) The process of copying data from					
	A) Writing B) Con	ntrolling	C) Booting	B	D) Reading	
	1.10) $(25)_{10} = (?)_2$					
	A) (11001) ₂ B) (10010			2	D) (10011) ₂	
	1.11) A relational database consists of					
	A) keys B) records	C) tab	oles	D) fie	lds	
	1.12) In a client/server model, a client	t .,				
	A) asks for information				nation and files	
	B) serves software files to oth	her computers	D) distr	ibutes data	files to other computers	
	1.13) Operating system manages		G) 7/0			
		ocessor	C) I/O d	levices	D) All the above	
	1.14) Laser Lights are used in its read			41. 4		
	A) Hard disk. B) CD.		C) Magneti	c disk	D) USB flash memor	У
	1.15) In which of the operating system	ns, the respons	se time is vei	ry critical:		
	A) Batch operating systems	B) Time-Sha	ring systems	C) Real	time operating systems	
	1.16) Programming language used in p				T) 1111T	
	A) Prolog B) Java		C) MySQI		D) VHDL	
	1.17) The operation is a unar			ecords in a		
	A) Update B) Inse		C)Delete		D) Join	
	1.18) Types of Operating Systems:		3440	70\ A11	.1 1	
	A) DOS B) OS) MAC		the above	
	1.19) is the software respons to the machine's hardware.	sible for running	ig programs	and provid	ing secure access	
		nol (3	Misson	A	10) 411 411	
	A) wildcard B) ken) Microsoft	Access	D) All the above	
	1.20) Real-time systems are		C) Community	M11000	morphing and	
	A) Scenial Humo is organing	systems			perating systems	
	B) Hati		D) Soft ep	eraung sys	terns	

1.21) $(10111)_2 = (\dots$		
1.21) $(10111)_2 = (\dots, 1)_1$ A) $(29)_{10}$	C) None of these	
1.22) Multiprocessor System to the use of tw	vo or more within a single compute	:5 'm
A) CPU	C) RAM D) Hard disk	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
1.23) controls peripherals such as printers a A) CPU B) ROM C) Operation	nd modems.	
1.24) In time sharing systems, processor's time is sl	g System D) All the above	
A) CPUs B) Hard disks		
1.25) To repeat the running of the same commands in	C) users D) All the above	
A) selection B) loop	dest.	
1.26) Which protocol is used to report error message	C) sequential D) SQL	
A) TCP B) IP		
1.27) The primary job of the Operating System is	D) 51v111	
A) manage commands B) manage re	Sources (C) manage programs	
1.28) You can enter your username in	o) marago programo	
A) button B) label	C) textbox D) form	
1.29) Multimedia means the use of more than one	in communication.	
A) file B) number C) med	ia D) sound	
1.30) structure allows a program to make a c	lecision on certain condition.	
A) Loop B) Sequential	C) Hierarchical D) Selection	
1.31) Freeware software available via FTP:	b) beleetion	
A) The author permits you to use it free.	Voy con you for short town f	
P) The author corries as convisited	of tou can use for short-term for evaluation,	
B) The author carries no copyright.) None of these.	
.32) A company has 10 branches distributed over the	cities of Egypt, the appropriate type of	
network for connecting these branches is A) PAN. B) WAN C) LA		
1.33) FTP is	AN D) MAN.	
A) Internet browser B) Search engir	C) Internet protectal D) No. 6	41
1.34) EEPROM stands for	c) memet protocor D) None of	tnese
A) Electronically Erasable Programmable Re	and Only Mamany	
B) Electrically Erasable Programmable Read		
C) Electrically Enabled Programmable Read	Only Memory	
.35) Tel net is and used in		
A) Internet browser, displaying web pages	C) Internet protocol, transferring web pages	
B) Internet protocol, file transfer	D) Internet protocol, remote log in	
.36) A banking system uses networks. A) Client/Server B) PAN		
A) Client/Server B) PAN .37) RGB code of the white color is	C) Peer-to-Peer D) None of these	
	C) 0 0 0	
.38) Programming language used in web page development	C) 0,0,0 D) 255,255,255	
.39) Which one of the following is not a network top	C) SQL D) Assembly	
1 \ 0		
.40) Which of the following is not a level of data abs	D) Bus	
7 1 2	C) logical level D) critical level	
.41) Complete the following command with the most	and the second s	
A) Button 1 B) label 1	C) textbox1 D) form1	
.42) SQL can be used to		
A) create database structures only.	C) modify database data only.	
B) query database data only.	D) All of the above	

1.43) in multiple users simultaneously	access the system	through the	s.
A) Multiprogrammed Batch systems			
E) time haring operating systems			
1.44) Interactive computer graphics uses various			
A) Mouse B) Graphic tablet			f these
1 45) Unix operating system is			
A) Multitasking operating system	C) Multiuser	operating system	
A) Multitasking operating system B) Time sharing operating system	D) All the abo	ove	
1.46) is the class of network we encounte	r in the university.		
A) PAN B) LAN	C) MAN	D) WAN	
1.47) is the most important/powerful			
A) Network server B) Network	rk client	C) Network swi	tch
1.48) A collection of hyperlinked documents on			
A) World Wide Web (WWW) B) Ma		pertext markup la	inguage
1.49) Database System = Database +		D) DDI	
A) SQL B) DBMS	C) ERD	D) DDL	
1.50) is a dynamic element. A) Text B) Graphics C) Video	D) Hyperteyt		
1.51) URL stands for	D) Hypertext		
A) Universal region locator	C) Univers	sal resource locate	or
B) Uniform resource locator	D) None of	f these	
1.52) To make the biggest Heading of a web pa			
A) <html> </html> B) <h1></h1>	Heading	C) <h2> Head</h2>	ing
1.53) Super computers are mainly useful for			
A) Data-retrieval operations	,		ensive applications
B) Mathematical intensive scientific	applications D)	None of these	
1.54) To make a title of a web page, write			
	C) <h1> H</h1>		
	D) <body> p</body>	page <td></td>	
1.55) It is specified as a non-volatile secondary			
A) Hard disk B) RAM	C) ROM	D) All th	ne above
Q.2) State if each of the following state	ments is True	or False:	
.1) A Process is a systematic series of actions a	computer uses to r	manipulate data.	
.2) Computer output is information that has bee	n produced by a co	omputer.	
.3) A server is a computer on a network that pro-			
.4) Hardware is the physical parts of a computer			
.5) Every general-purpose computer must have a			grams.
.6) A bit is the smallest unit of information held		1	9
.7) A BUS is the channel or path that lets the par		communicate with	each other.
.8) The results of the processing are kept tempor			
.9) User friendly is computer software or a hard			
	-	e to set up and use	
.10) Personal computers can be used as servers.			
.11) A minicomputer is usually designed to serv		imultaneously.	
.12) The memory manager is the core of an oper			
.13) The Intersection operation takes two relation			a thom
Where the result set obtained after this op		mon rows perweer	i uiem.
.14) Unix is an event-driven interface operating			
1.7	a comparer.		

- 2.16) Operating a first hardware controlling program after pressing the power button in personal computers.
- 2.17) Log On command in MS. Windows is used to switch between the different users of computer.
- 2.18) Multimedia elements can be classified into static and dynamic elements.
- 2.19) Time-Sharing operating systems use the CPU switching between multiple jobs.
- 2.20) In multiprogramming, the CPU will never be idle.
- 2.21) Unix is the first GUI operating system.
- 2.22) The result of a SQL SELECT statement is a report.
- 2.23) The Internet is often considered the most complex engineered system on the earth surface.
- 2.24) No one owns the Internet.
- 2.25) Disadvantages of File systems to store data is data isolation
- 2.26) Peer-to-peer networks are more commonly implemented where larger than ten computers are involved.
- 2.27) Each student at Tanta University is assigned an official electronic mailbox.
- 2.28) A central computer acts as the storage location for files and applications shared on the network.
- 2.29) In Client/server networks the server needs to run an operating system that supports networking.
- 2.30) Information providers represent their information in a specific language called Hyper Text Markup Language.
- 2.31) RGB code of the black color is 0,0,0
- 2.32) DBMS stands for Database Basic Management System
- 2.33) A company needs its products and service to be known for the public is an example for information consumer.
- 2.34) In Visual Basic, the command MessageBox("Hello World") is correct?
- 2.35) A relation is a two dimensional table
- 2.36) In Visual Basic, can you change the background color of the form in run time?
- 2.37) logical model(s) are used to describe data at Physical level
- 2.38) The mail client program to contact to the mail server to Tanta University is Outlook from Google.
- 2.39) A PAN covers a larger geographical area than a MAN
- 2.40) Google is not a web browser
- 2.41) In Visual Basic, the command Me.BackColor = Yellow is correct?
- 2.42) The mail server name in Omar@tanta.edu.eg is tanta.edu.eg
- 2.43) In search window of Windows, a wildcard character is a special symbol that stands for one or more unknown characters.
- 2.44) HTTP is an Internet browser
- 2.45) Multimedia involves only one (1) media type.

Q.3) Write the question then write the answer: (10 Marks)

- a) Write short notes about four different types of computers. (3 Marks)
- b) Define the priority of the operations in the following expression, A*(B+C) + D/(A*2.0)

A*(B+C) + D/(A*2.0) (2 Marks) c) What are the main components of an operating system? Write short notes about them? (3 Marks)

- of what are the main components of an operating system: write short notes about them: (5) what
- d) What is meant by the data security? How can you achieve that in your computer? (2 Marks)



Department: Computers and Automatic Control Total Marks: 60 Marks



Course Title: Computer Technology Course Code: CCE0101 Year: Preparatory Date: 3-2-2022 Allowed time: 3 hrs. Model: B Q.1) Choose the correct answer: (01+02)50 Marks) 1.1) computer is a form of computer that uses the continuously changeable aspects of physical phenomena. A) A Digital B) An analog C) A Hybrid 1.2) Multi-programmed Batch Systems A) decreases CPU utilization C) increases CPU utilization B) decreases RAM utilization D) increases RAM utilization 1.3) It is specified as a main memory A) Hard disk B) CD/DVD C) RAM D) Floppy disk 1.4) Which of the following is the most powerful type of computers? A) Super conductor B) Microcomputer C) Super computer D) Mainframe 1.5) Which one of the following is an application software package? A) Windows B) Red hat Linux C) Microsoft Office D) All the above 1.6) The input device to the computer is A) a mouse B) touch screen C) a keyboard D) all the above 1.7) The mail server for the E-mail address: ahmed@gmail.com is: A) gmail B) ahmed C) gmail.com D) ahmed@gmail.com 1.8) A user can make any change in the image using -A) Interactive computer graphics C) Both (A) & (B) B) Non-Interactive computer graphics D) None of the above 1.9) Laser Lights are used in its read / write operations: A) Flash memory B) Hard disk C) Magnetic disk D) CD/DVD 1.10) $(22)_{10} = (?)_2$ A) $(10110)_2$ B) $(10010)_2$ C) $(01101)_2$ D) (10111)₂ 1.11) A relational database consists of a collection of A) keys B) records C) tables D) fields 1.12) In a client/server model, a client A) asks for information C) provides information and files B) serves software files to other computers D) distributes data files to other computers 1.13) Operating system manages A) Memory B) Processor C) I/O devices D) All the above 1.14) The process of copying data to a memory location is called A) Controlling B) Writing C) Booting D) Reading 1.15) In which of the operating systems, the response time is very critical: A) Batch operating systems B) Time-Sharing systems C) Real time operating systems 1.16) Programming language used in program development is A) Prolog B) Java C) MySOL D) VHDL 1.17) The operation is a unary operation that modifies records in a database table A) Update B) Insert C)Delete D) Join 1.18) Types of Operating Systems: A) DOS B) OS/2 C) MAC D) All the above 1.19) is the software responsible for running programs and providing secure access to the machine's hardware. A) wildcard B) kernel C) Microsoft Access D) All the above

C) General purpose operating systems

D) Soft operating systems

1.20) Real-time systems are

B) Hard operating systems

A) Special purpose operating systems

4 to		· ·	
1.21) $(10111)_2 = (\dots, 2, \dots)_{10}$	19 00 - 10 - 10	<u>`</u> .•	
A) (29) ₁₀ B) (23) ₁₀	None of these		
1.22) Multiprocessor Systems refers to the use of	f two or more	within a single computer	system.
A) CPU B) ROM	(C) RAM	D) Hard disk	
1.23) controls peripherals such as printer A) CPU B) ROM C) Opera	s and modems.		
A) CPU B) ROM C) Opera	ting System	D) All the above	
1.24) In time sharing systems, processor's time is	s shared among multin	ole	
A) CPUs B) Hard disks	C) users	D) All the above	
1.25) To repeat the running of the same command	is more than one time	, structure is used.	
A) selection B) loop	C) sequential	D) SQL	
1.26) Which protocol is used to report error message	age:	,	
A) TCP B) IP	C) ICMP	D) SMTP	
1.27) The primary job of the Operating System is			
A) manage commands B) manage	resources C) may	nage programs	
1.28) structure allows a program to make	a decision on certain	condition.	
A) Sequential B) Loop	C) Selection	D) Hierarchical	
1.29) Multimedia means the tise of more than one	in communica	tion.	
A) file B) number	C) media	D) sound	
1.30) You can enter your username in	,	-, 55 4344	
	C) label	D) teythox	
1.31) Freeware software available via FTP:	C) 14001	D) textoox	
	C) ***		
A) The author permits you to use it free.		short-term for evaluation.	414.
B) The author carries no copyright.	D) None of these.		
1.32) A company has 10 branches distributed over t	the cities of Egypt, the	e appropriate type of	· isi
network for connecting these branches is.			1000
A) PAN. B) WAN C)	LAN	D) MAN.	_ X
1.33) FTP is			
A) Internet browser B) Search en 1.34) EEPROM stands for	gine C) Internet	t protocol D) None of t	hese
1.34) EEPROM stands for			
A) Electronically Erasable Programmable	Read-Only Memory		
B) Electrically Erasable Programmable Re	ead-Only Memory		•
C) Electrically Enabled Programmable Re	ad Only Memory		
1.35) Tel net is and used in			
A) Internet browser, displaying web pages	C) Internet protoco	l. transferring web pages	
B) Internet protocol, file transfer	D) Internet protoco	ol. remote log in	
1.36) A banking system uses networks	S.	***	4
A)-Client/Server B) PAN	C) Peer-to-Peer	D) None of these	
1.37) RGB code of the white color is	-)	D) I tollo of these	
A) 255,255,0 B) 0,0,255	C) 0,0,0	D) 255,255,255	
1.38) Programming language used in web page dev		0) 233,233,233	
A) Visual Basic B) HTML	C) SQL	D) Assembly	•
1.39) Which one of the following is not a network t		D) Assembly	
A) Star B) Ring C) LAN	D) Bus		
1.40) Which of the following is not a level of data a			
A) view level B) physical level		D):	
E The P	C) logical level	D) critical level	
1.41) Complete the following command with the m			
A) Button B) label 1	C) textbox1	D) form1	
1.42) SQL can be used to			
A) create database structures only	y. C) modify	database data only.	
B) query database data only		the phone	

	1.43) In, multiple users simultaneously acce	ess the system through terminals.
	A) Multiprogrammed Batch systems	C) Simple Batch Systems
	B) time sharing operating systems	D) Real-time systems
	1.44) Interactive computer graphics uses various kin	
	A) Mouse B) Graphic tablet	C) Joystick D) All of these
	1.45) Unix operating system is	
	A) Multitasking operating system	C) Multiuser operating system
	B) Time sharing operating system	D) All the above
		C) MAN D) WAN
	1.47) is the most important/powerful com	puter in a typical network.
	A) Network server B) Network cli	
	1.48) A collection of hyperlinked documents on the	internet forms
	A) World Wide Web (WWW) B) Mailing	g list C) Hypertext markup language
	1.49) Database System ≡ Database + A) SQL B) DBMS	C) ERD D) DDL
	1.50) is a dynamic element.	**************************************
	A) Text B) Graphics C) Video	D) Hypertext
	1.51) URL stands for	,
		C) Universal resource locator
	B) Uniform resource locator	D) None of these
	1.52) To make the biggest Heading of a web page,	write
	A) <html> </html> B) <h1> Hea</h1>	
	1.53) Super computers are mainly useful for	(1) Input output intensive amlications
	A) Data-retrieval operations	C) Input-output intensive applications ications D) None of these
	B) Mathematical intensive scientific appliance 1.54) To make a title of a web page, write	cations b) None of these
	A) html>	C) <h1> Heading </h1>
	B) <title> Title</title>	D) <body> page </body>
	1.55) It is specified as a non-volatile secondary me A) Hard disk B) RAM	
	A) Haid disk D) Idayi	
	Q.2) State if each of the following statemen	nts is True or False:
1	2.1) A Process is a systematic series of actions a com	
,	2.2) Computer output is information that has been pro	oduced by a computer.
,	2.3) A server is a computer on a network that provide	s a service to other computers.
,	2.4) Hardware is the physical parts of a computer syst	em that you can see and touch.
,	2.5) Every general-purpose computer must have an or	perating system to run other programs.
,	2.6) The results of the processing are kept temporarily	y in RAM until they are needed again.
	2.7) A BUS is the channel or path that lets the parts of	f a computer communicate with each other
	2.8) A byte is the smallest unit of information held in	
	2.9) User friendly is computer software or a hardware	a that is simple to set up and use.
	2.10) Personal computers can be used as servers.	ultiple vaces simultaneously
	2.11) A minicomputer is usually designed to serve m	
-	2.12) The memory manager is the core of an operating	g system.
	2.13) The Intersection operation takes two relations w	/ith the same set of attributes.
	Where the result set obtained after this operating sys	tem
	2.14) Unix is an event-driven interface operating system 2.15) In batch processing, user can interact with a continuous c	
	mile) in occor processing, user san micrael will a con	

- 2.16) OS/2 is the first GUI operating system.
- 2.17) Log On command in MS. Windows is used to switch between the different users of computer.
- 2.18) Multimedia elements can be classified into static and dynamic elements.
- 2.19) Time-Sharing operating systems use the CPU switching between multiple jobs.
- 2.20) In multiprogramming, the CPU will never be idle.
- 2.21) Operating system is the first software controlling program after pressing the power button in computers.
- 2.22) The result of a SQL SELECT statement is a report.
- 2.23) The Internet is often considered the most complex engineered system on the earth surface.
- 2.24) No one owns the Internet.
- 2.25) Disadvantages of File systems to store data is data isolation
- 2.26) Peer-to-peer networks are more commonly implemented where larger than ten computers are involved.
- 2.27) Each student at Tanta University is assigned an official electronic mailbox.
- 2.28) A central computer acts as the storage location for files and applications shared on the network.
- 2.29) In Client/server networks the server needs to run an operating system that supports networking.
- 2.30) Information providers represent their information in a specific language called Hyper Text Markup Language.
- 2.31) A relation is a two dimensional table
- 2.32) DBMS stands for Database Basic Management System
- 2.33) A company needs its products and service to be known for the public is an example for information consumer.
- 2.34) In Visual Basic, the command MessageBox("Hello World") is correct?
- 2.35) RGB code of the black color is 0,0,0
- 2.36) In Visual Basic, can you change the background color of the form in run time?
- 2.37) logical model(s) are used to describe data at Physical level
- 2.38) The mail client program to contact to the mail server to Tanta University is Outlook from Google.
- 2.39) A PAN covers a larger geographical area than a MAN
- 2.40) Google is not a web browser
- 2.41) In Visual Basic, the command Me.BackColor = Yellow is correct?
- 2.42) The mail server name in Ahmed@tanta.edu.eg is tanta.edu.eg
- 2.43) In search window of Windows, a wildcard character is a special symbol that stands for one or more unknown characters.
- 2.44) HTTP is an Internet browser
- 2.45) Multimedia involves only one (1) media type.

Q.3) Write the question then write the answer: (10 Marks)

a) Write short notes about four different types of computers.

(3 Marks)

b) Define the priority of the operations in the following expression,

A*(B - C) - D/(A*2.0)

(2 Marks)

- c) What are the main components of an operating system? Write short notes about them? (3 Marks)
- d) What is meant by the data security? How can you achieve that in your computer?

(2 Marks)

lications



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Course Title	Engineering Chemistry	Final Exam	Course Code	PME0104
Date	17/1/2022	Model no. kcn335	Allowed time	3 hours

Part one: Answer the following questions in the electronic sheet

First Question: Choice the correct answer:

1- A mixture containing 40% benzene (B) and toluene (T) by mass is fed to a distillation column by a rate

stream. The	rate of th		ved from th	e top of th			as four times of the	
		_			final proc	luct =	Kg	
a) (753		o) 2000						
In the quest			Benzene in	n the distil	ate =	Kg	1	
a) 753		2) 738)	c)2000		15			
3- In the quest						g		
a) 753		b) 3012			1247)			
In the quest	tion (1) the				n product	=Kg	5	
a) 753		b)1247	/ ~		d) 63			
	Manage Control of the			-		_	n product =	Kg
		b) 3012			(d) 1247			
6- In the quest					,	Kg	12 H20	
a) 2259		b) 3012) 1247'	. 1	19-7 UK	
7- In the quest	, ,	e returned ra				Haz	0.0	
a) 3	b) 2		(c) 1)	d) 4	0	1	3 108
8- Gaseous Fu	iel used in	a furnace I	ts Composi	tion as the	following	100	X01)	100
Element	C	H ₂	O ₂	S	N ₂	H ₂ O	ash	30
% by weight	89%	3%	2%	1%	2%	2%	1%	>

The weight of oxygen needed from the air needed to burn one hundred kilogram from that fuel (complete combustion) =Kg

a) 263 b) 261

c) 1135

9- In the question (8) the weight of air needed to burn one hundred kilogram from that fuel (complete

combustion) =Kg

a) 263 b) 261

c) 1135 d) 864

10- In the question (8) the weight of carbon dioxide produced in combustion products (burning one hundred kilogram from that fuel complete combustion) =Kg

(b)238 >

c) 251 d) 1135

11- In the question (8) the weight of water vapour produced in combustion products (burning one hundred kilogram from that fuel complete combustion) =Kg 6029 c)24

12- In the question (8) the weight of sulphur dioxide produced in combustion products (burning one hundred kilogram from that fuel complete combustion) =Kg

a) b) 0.5 c) 2 d) 0.3 13- In the question (8) the total weight of combustion products (dry products burning one hundred kilogram from that fuel complete combustion) =Kg

1233.5 b) 1231.5 c) 1204.5

d)1206.5

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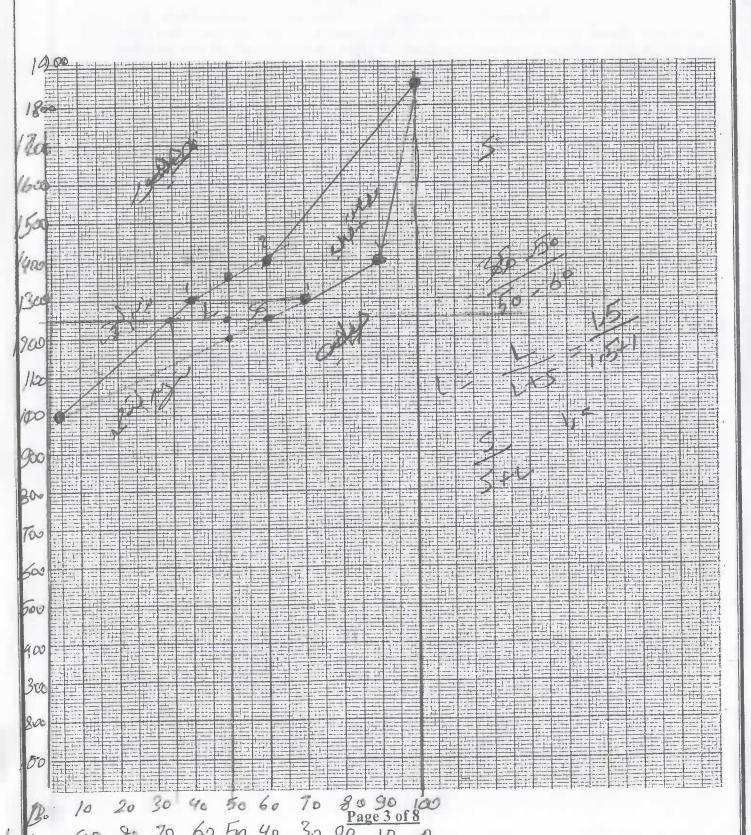


Fanta University	Faculty of Engineering
white his are and a constitution	and the the terms of the control of
	١٦- عند ذوبان مادة صلبة في سائل فإن درجة الغليان للمحلول ا
ج) متساوية د) لا تؤثر	اکبر من ب) أقل من
	١٧- جرام جزيني / لتر هي أحد وحدات التعبير عن التركيز وه
	أ) -طريقة وزن الحجم - ب) المولالية
	عدد للجرامات المذابة في 000
	١٨
ح العدارية العدارية	 أ) طريقة وزن الحجم ب) المولالية
185° م ، تأما الإمتزاج في حالتي الصلب و المصهور ، وتبدأ السبيكة	۱۹- معدنان أ درجة انصبهاره 1000° م، ب درجة انصبهاره 0
° م وتنفصل منها مادة صلبة تحتوي على 70% "ب" في حين تبدأ السبيكة	المحتوية على 60% أفي التحمد عند درجة حرارة 1300
م وتنفصل منها مادة صلبة تحتوي على 90% "ب". للسبيكة التي تحتوي	
<u> </u>	على 50% أدرجة بداية التجمد =
1210 ()	
	٢٠ في السؤال (19) للسبيكة التي تحتوي على 50% أ درجة ن
	1400 (1
)، 2000 . بة حرارة 1250° م يكون تركيب السيبيكة عبارة عن خليط من صلب	
	ومصهور ويكون تركيب المادة الصلبة فيها =
41 (2	
بة حرارة 1250° م يكون تركيب السيبيكة عبارة عن خليط من صلب	
	ومصهور ويكون تركيب المصهور فيها =% (أ
32 (2 59 (68 (۱ ب)
بة حرارة 1250° م بتطبيق قاعدة الطور تكون قيمة ال (F) =	
	(2 () 1 ()
بة حرارة 1600° م بتطبيق قاعدة الطور تكون قيمة ال (F) =	٢٤- في السؤال (19) للسبيكة التي تحتوي على 50% أعند در
3 (2	ر ا ب کا (ا
Question (2):	
men 1	
Write $(\sqrt[4]{})$ for the true statement and write (x) for the fall	se sentence in the answer sheet
1. Combustion is a chemical reaction between an oxidant a	and fuel.
2. Material balance equation can be done on chemical production	cess as the form the input to the process equal the
output of the process. (4)	walt
3. Atmospheric air consists of 77% N ₂ and 23 % O ₂ by vol	
	٤. مثال على الحيود السالب محاليل الماء و الميثانول كر
جون وثاني أكسيد الكربون في المذبيات الهيدروكربونية في مدي درجات	 كلما زادت درجة الحرارة تزداد ذوبانية كلا من غازي الار.
	الحرارة من ۲۸۸° كلفن إلى ۳۰۳ ° كَلْفَ ﴿)
فيه جميع قوي التجاذب مابين المكونات وبعضها وبين السوائل النقية ب	 ٦. السلوك المثالي للسوائل هو عبارة عن السلوك الذي تتساوي
	٧. ذوبان الأكسجين في الماء يتبع قانون هنري للذوبانية الغازا
	 بنطبق قانون راؤولت علي السوائل العديمة الإمتزاج . (
	- في الحيود الموجب عن قانون راؤولت يزداد الحجم والضغم
ن قوي التجاذب بين جزينات المحلول أكبر من قويالتجاذب بين جزيئات السانل	١٠. في الحيود الموجب يحدث تنافر بين جزينات المحلول وتكور
2.	النقي (٢)
النقي ب()	١١. الضَّغطُ البخاري للمحلول اكبر من الضغط البخاري للسائل
تقل درجة الحرارة به)	١٢. في الحيود السالب عن قانون راؤولت يقل الحجم والضغط و
	١٣. المحاليل هي مخاليط متجانسة وتكون نسب مكوناتها متغيرة
	← 1. كلا من الغازات الأتية شره الذوبان في الماء غاز كلوريد الر
	١٥. مثال علي الحيود الموجب خليط الكلوروفورم و الأسيتون. ٧
نَ تحويل المادة الصلبة إلي سائلة عن طريق الذوبان في الماء مثل جميع	
	السبائك . ﴿
المادة الصلبة في الغازات . ﴿)	١٧. إتحاد أكسيد الكالسيوم مع ثاني أكسيد الكربون إحدي صور ذوبان
التجاذب بين جزيئات المحلول أقل من قوي التجاذب بين جزينات السائل النقي .()	١٨. بزيادة مساحة السطح نقل عملية الإدمصاص بـ (١٥)
End of first part questions	





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Course Title	Engineering Chemistry	Final Exam	Course Code	Di Corolo	
Date	17/1/2022	Model no.	Allowed time	PME0104 3 hours	
Part two:	Answer the following q	uestions in the al	antronia -1		
25. Which o A. The B. The C. The	f the following processes always true.	ways results in an inc work on the surroun work on the surroun	rease in the energy dings. dings.	of a system?	
26. A gas is co 10.0 atm	ompressed in a cylinder from Calculate the amount of wo	a volume of 20 L to rk done on the system	2.0 L by a consta m.	nt pressure of	
A. 1.0	$1 \times 10^4 \text{J}$ B180 J C. 1	.84×10 ⁴ J D1	$.81 \times 10^4 \text{ J}$	E.180J	
B. Perr C. Ene D. Ene	to the first law of thermodyngy is neither lost nor gained betual motion is possible. Try is conserved in quality by the gray is being created as time provided when time began.	in any energy transf		iverse now	
$A O_2(g$	hese processes is endothermit $(x) + 2H_2(g) \rightarrow 2H_2O(g)$ $(y) + 2CH_3OH(g) \rightarrow 2CO_2(g)$	B. $H_2O(g) \rightarrow 0$	H ₂ O(l) D. H ₂ O(s)	\rightarrow H ₂ O(l)	
9. An endothe A. warr	ermic reaction causes the surn n up. B. become acidic	oundings to C. C. condense.	D. decrease in ten	nperature.	
A. warm	mic reaction causes the surroup. Become acidic. C.	expand. D. decr			
constant p	le of nitrogen gas has a volumeressure. What is the final volume L B. 19.3 L C. 31.4 L	ume of nitrogen?	. The gas is heated E. 356 L	1 to 220°C at	3
A. 10°C	f N ₂ gas occupies 2.40 L at 2 constant pressure, at what ter	nperature will the N D. 313°C	2 occupy 4.80 L? E. 685°C	VI Ve	, 1
What facto A. 8	are of a gas sample is quadruper does the volume of the same B . 2 C . $1/2$ D .	ple change?	temperature is do	oubled, by 293 =	4.

34. A mixture of gases contains 4.46 moles of neaon (Ne) . 0.74 mole of argon (Ar) and 2.15

· A. SELECT PROPERTY AND ADDRESS OF THE PARTY OF THE PART

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moles of xenon	(Xe).0	Calculate the pa	rtial pressures o	f the argon (Ar	e) gas if the total
pressure is 2.00	atm at a cer	tain temperatur	e.		
[a]] 0.10 atm	[b] 0.586 atm	[c] 0.20 atm	[4] 1.21	atm

35. Calculate the number of liters of carbon dioxide measured at STP that could be produced from 7.45 g of propane. A) 1.90 L CO2 B) 3.80 L CO2 C)12.5 L CO2 D)11.4 L CO2

36. Samples of the following volatile liquids are opened simultaneously at one end of a room. If you are standing at the opposite end of this room, which species would you smell first?[Assume that your nose is equally sensitive to all these species.

a. ethyl acetate (CH ₃ COOC ₂ H ₅)	b. camphor $(C_{10}H_{16}O)$
c. naphthalene ($C_{10}H_8$)	. d diethyl ether (C2H5OC2H5)

37. The unit(s) of free energy change ΔG° is(are) D. J·K·mol-1 C. $J \cdot mol - 1 \cdot K - 1$ A. J·mol-1

38. During the interaction between the system and the surrounding the amount of energy gained by the system must be exactly equal to the amount of energy lost the surrounding.

b. Second law of thermodynamic

Third law of thermodynamic d. Zero law of thermodynamic 39. They are related to the molecular structure of a system and the degree of the molecular

b .a macroscopic form of energy. a. microscopic form of energy.

40. Greater value of standard reduction potential greater will be tendency

d. a&c

41. The half cells are interconnected through. A. Wire B. salt bridge C. electric circuit B. no connection exists

a. First law of thermodynamic

c. Chemical energy.

42. What is **2**G° per mole of dichromate ions for the reduction of dichromate ions, Cr₂O₇², to Cr³⁺ by bromide ions, Br, in acidic solution in galvanic cell? (Hint: Use the standard cell potential.) (a) +26.3 kJ (b) -158 kJ(d) -26.3 Kj

43. The amount of heat required to rise the temperature of 11bm of distilled water 1°F a-Specific heat Btu c-Calory d-Heat capacity

44. The total entropy of a mixture of gases is the _____ of the partial entropies.

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	Anodic inhibitors are substances such as Na ₂ CO ₃ that react with the anodically formed Fe ions to form insoluble iron carbonate which deposit on the anode and isolate it from the corrosive medium.
39.	Cathodic protection of underground steel pipeline is carried out (externally using less Nobel galvanic anode (galvanic cell) Zn or Mg rod
40.	Presence of differential aeration oxygenation cells takes place due to the difference in
	the porosity of the concrete, This is the most common reason which causing Corrosion of Steel Reinforcement in Concrete.
41.	Dissimilar metal corrosion cells are set up when two different metals become in
40	contact with each other in the presence of an electrolyte
42.	The less Nobel metals acts as the anode and the more Nobel metals acts as the cathode where H2 evaluation takes place in the electrochemical cell
43.	Differential aeration (oxygenation)cells: This type of corrosion cells takes place
	whenever there is a difference in the dissolved O2 conc. Where O2poor area acts as the anode and the O2 rich area act as the cathode
44.	.Chemical corrosion takes place due to direct attack by acids or alkalis
45	Metals above H ₂ in the e.m.s do not dissolve in acids (known by Nobel metals)because
	it is difficult to loss their electrons and difficult to convert into ions
46.	Temporary Coating (coating with lubricating oil or Vaseline which removed easily by an organic solvent
47.	coating with more Nobel metal(must not be free from cracks or pores) like Zn(
48.	Presence of dissimilar metal corrosion cell is the most common reason which causing
	Corrosion of Steel of Reinforcement in Concrete.
49.	Temporary Coating is not one of the Methods of protecting metals against corrosion
50.	In the metallic coating: Coating with more Nobel metal must be free from cracks or pores (like Cu)
51.	The passive layer formed on the reinforcement steel is a Layer of the iron oxides and hydroxides formed on the reinforcement steel as a result of exposing it to the
	atmospheric oxygen
52.	If the amount of calcium increases in the mixture too much during the production of
	cement, The cement damaged and exposed to cracking
53.	Reactions inside the rotary kiln (furnace), Part of Iron oxide reacts with Al ₂ O ₃ and CaO
	to form C4AF(X
54	. The compounds which are responsible for final strength of Cement is Tricalcium
	silicate & Tricalcium Aluminate
	End of questions
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Reduction reaction of metal	Standard reduction potential: E° (V)
$Au^+ + e^- \rightleftharpoons Au(s)$	1.83
$Au^{3+} + 2e^- \rightleftharpoons Au^+$	1.36
$Au^{3+} + 3e^- \rightleftharpoons Au(s)$	1.52
$AuCl_4^- + 3e^- \Rightarrow Au(s) + 4Cl^-$	1.002
$Fe^{2+} + 2e \rightleftharpoons Fe(s)$	-0.44
$Fe^{3+} + 3e^- \rightleftharpoons Fe(s)$	-0.037
$Fe^{3+} + e^{-} \rightleftharpoons Fe^{2+}$	0.771
$Mn^{2+} + 2e \Rightarrow Mn(s)$	-1.17
$Mn^{3+} + e^- \rightleftharpoons Mn^{2+}$	1.5
$MnO_2(s) + 4H^+ + 2e^- \Rightarrow Mn^{2+} + 2H_2O(1)$	1.23
$MnO_2(s) + 4H^+ + e^- \rightleftharpoons Mn^{3+} (aq) + H_2O(I)$	0.95
$MnO_4^- + 4H^+ + 3e^- \Rightarrow MnO_2(s) + 2H_2O(1)$	1.70
$MnO_4^- + 8H^+ + 5e^- \Rightarrow Mn^{2+} + 4H_2O(1)$	1.51
$Ag^+ + e^- \rightleftharpoons Ag(s)$	0.7996
$AgBr(s) + e^- \Rightarrow Ag(s) + Br^-$	0.071
$Ag_2C_2O_4(s) + 2e^- \rightleftharpoons 2Ag(s) + C_2O_4^{2-}$	0.47
Ga ³⁺ + 3e− ⇌ Ga(s)	-0.56
$Cu^+ + e^- \Rightarrow Cu(s)$	0.520
$Cu^{2+} + \epsilon = Cu^{+}$	0.159
$Cu^{2+} + 2e^- \Rightarrow Cu(s)$	0.3419
$Br_2 + 2e^- \rightleftharpoons 2Br^-$	1.087
$HOBr + H^+ + 2e^- \rightleftharpoons Br^- + H_2O(1)$	1.341
$Cr^{3+} + e^{-} \rightleftharpoons Cr^{2+}$	-0.424
$Cr^{2+} + 2e^- \rightleftharpoons Cr(s)$	-0.90
$Cr_2O_7^{2-} + 14H^+ + 6e \rightleftharpoons 2Cr^{3+} + 7H_2O(1)$	1.36
$Mg^{2+} + 2e^- \Rightarrow Mg(s)$	-2.356
$Mg(OH)_2(s) + 2e^- \Rightarrow Mg(s) + 2OH^-$	-2.687
$Al^{3+} + 3e^- \Rightarrow Al(s)$	-1.676
$AI(OH)_4^- + 3e^- \Rightarrow AI(s) + 4OH^-$	-2.310





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(a) average	b) weighted mean c) sum d) difference of the highest and the	ne lowest
2.37%, N	themical Composition of a sample of cement are as the following: (MgO 0.79%_, Fe ₂ O ₃ 3.11%, Al ₂ O ₃ 4.74%, SiO ₂ 23.44%, CaO 64. weight % of the following compounds the Silica modulus A. 1 B. 1.52 D. 2.99	.74%). Calculate equal
46.From th	A. 1.52 B.1 C. 2.99 D. 2.07	9
47. From t	the problem no.(45) calculate the hydraulic modulus? 1-8 - 2 A. 1 B. 2.99 C.1.52 D. 207	-2
48. Lime S as a source	stone is one from Raw materials used in the manufacture of cement: c of	which is consider D. SiO ₂
49. Sand	added to adjust the composition of the mixture used in the manu	facture of cement t
	SiO2 =in the Cement. A. 11% B. 21 % C.22%	
50. The	choose of the suitable method for the production of cement depend	ds on
a.	type of the raw materials b. the availability of the fuel. c. materials d.All the previous	. quality of the rav
51. If th	e amount of Al ₂ O ₃ , the burning of cement will occur at	temperatu
and	d the produced cement will be fast -hardening.	
	decreases -high B. increases -high C. increases -low	D. decreases -low
hydrogen: a): 53. Choos	on dioxide molecules effuse at an average rate of 5 mol/s, at what remolecules effuse in the exact same conditions? 23.5 mol/s b) 4.7 mol/s c) 110 mol/s d) Not enough information the substance with the higher entropy per mole at a given temperature.	ation is provided ature: CO ₂ (g) or
). $CO_2(aq)$ AL
exter solut	cell reaction is $P(2^{+}(s)) + A(s) \rightarrow P(2^{+}(s)) + 2A(s^{+}(s)) \rightarrow P(s^{+}(s))$	11.0 M AI(NO3)3 ne balanced overall $3Pb^{2+}(aq) + 2Al(s)$.

55. Consider an electrochemical cell based on the following cell diagram: Pt | Pu³⁺(aq), Pu⁴⁺(aq) | Cl₂(g), Cl (aq) | Pt

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chlorine is 1.36 V, what is the standard reduction potential E°(Pu ⁴⁺ /Pu ³⁺)?	,
A.2.37 V B.1.01 V C1.71 V D1.01 V	
Write (v) for the true statement and write (x) for the false sentence in the answer sheet	
20. The critical temperature in the pressure – volume diagram Upon which are drawn isothermal of CO curves is 31 °C	/
the same water-cement ratio, It is the High rapaid cement	
and chloride from solution to penetrate to the steel and decrease the pH	1
(incomplete combustion)	
 27. Adiabatic changes mean that: It is the process in which the system does not gain or loss heat. It is closed system	
31. Gas Effusion is a direct demonstration of gaseous random motion is provided by diffusion, the gradual mixing of molecules of one gas with molecules of another by virtue of their kinetic properties.	
32. When the combustion be incomplete: part of carbon converted to carbon dioxide and the rest to carbon monoxide, all hydrogen converted to water and all sulphur converted to sulphur dioxide	
33. Atmospheric air consists of . 21% O ₂ & 79% N ₂ by weight	
35. The important factors which may influence the corrosion process are: Nature of the metal, nature of the environment and the corrosion products & Temperature	
only	
amount (e.g.0.3%)	
Page 4 of 6	

98-1- NE 1/-B 2000 kg/hm Condence-401 Banzin 601. T 95.1.TP 5-1-8 Partial general Madial Balance on Distristion Colu Ban f= p+1° Pastial Matial Bulance on Condenser Banzen f * 40 = 100



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Physical and Mathematical Engineering Department



Faculty of Engineering

Course Title	Engineering Chemistry	Final Exam	Course Code	PME0104
Date	17/1/2022	Model no. kcm235	Allowed time	3 hours

Dat	e 17/1/2022	Model no.	Allowed time	3 hours
		kcm235		
Pa	rt one :Answer the following o	questions in the elec	tronic sheet	
Fir	st Question: Choice the correct answer:			
1 -	A mixture containing 40% benzene (B) 2000 Kg/hr. An overhead stream of 98v stream. The rate of the vapor leaved fro of the distillate. Assuming basis is one	and toluene (T) by mass is vt% B is produced, and 95° m the top of the distillation hour	% of the Toluene n column was found	leaves in the bottom r times of the amount
2-	In the question (1) the amount of the bo	ene in the distillate = 2000 d) 15	Kg	=752.6 W=129
)-	a) 753 b) 3012 c) 20	00 0 1247	2	
	In the question (1) the amount of Tolue a) 753	1184 d) 63		
	In the question (1) the amount of vapor a) 2000 b 3012	c)1184 d) 1247		oduct =Kg
-	A) 2239 0) 3012 pc)	2000 d) 1247	Kg	
7-	In the question (1) the returned ratio (R	c) 1 d) 4		
	ال التركيز هنا هي	جرام مكافئ / لتر طريقة التعبير ع	د الصوديوم تركيزه د	 ۸- محلول یتکون من کلوری
	I ARB PARTY AND	لالية . بجر العيارية	لحجم ب) المو	ا) طریقة وزن ا
	مقارنة بالسائل النقي. ٢٦	لالية	ي سائل فإن درجة التجه	٩- عند ذوبان مادة صلبة في
	تؤثر المستحدد المستحد	ح) متساوية د) لا ان للمحلول الناتج تكون	مبر) أقل من	ا) اکبر من
	مقارنة بالسائل النقي.	ان للمحلول الناتج تكون	ي ساتل فإن درجة الغلب	١٠ عند دُوبانِ مادة صلبة في
7	٠) لا توثر	ج) متساوية د	ب) اقل من	مهر اکبر من
		التركيز وهي وحدة قياس	حد وحدات التعبير عن	١١- جرام جزيني / لتر هي ا
1	المولارية المولارية	لالية ج) العيارية		۱) طریقه وزن ۱
		بة في 1000 جرام مديب	عدد الجرامات المذا	_17
	400 W	ن الجزيئي	= الوز	- 1 1
	5 B a 1 1 2 1 ()	لالية ج) العيارية	لحجم کے) الموا	أ) طريقة وزيرا
	اج في حالتي الصلب و المصهور ، وتبدأ السبيكة	الصهاره 1850 م، تاما الامتز	ه 1000 م ، ب در جا	۱۳ ـ معدنان ا در جة إنصهار ه
2	صلبة تحتوي على 70% "ب" في حين تبدأ السبيكة	ارة 1300° م وتنفصل منها مادة	ى التجمد عند درجة حر	المحتوية على 60% أف
	صلبة تحتوي على 90% "ب". للسبيكة التي تحتوي	ارة 1500° م و تنفصل منها مادة ه	ي التجمد عند درجة حر	المحتوية على 40% أفر
		۰۰۰۰۰ م	التجمد =	علي 5 <u>0% أ</u> درجة بداية
	1210 (2			1400
	٠	% ا درجة نهاية التجمد =	ة التي تحتوي علي 50	١٤- في السؤال (13) للسبيك
	1000 (2	1850 (ਣ	1210	1400 (1
	ون تركيب السيبيكة عبارة عن خليط من صلب	% ا عند درجة حرارة 1250° م يك	التي تحتوي على 50	١٥- في السؤال (13) للسبيكة
				ومصهور ويكون تركيب
			32 (+	
	ون تركيب السيبيكة عبارة عن خليط من صلب	% ا عند درجه حرارة (1250° م يك	الذي تحنوي على () 50	١١٠ في السؤال (13) للسبيكة
				ومصهور ویکون ترکیب از ۵
	32	(3 59)	41 (-	100 ('
	طبيق قاعدة الطور تكون قيمة ال (F) =	۱۶۰ علد درجه حراره ۱۷۵۵° م بد ج) 0	اللي تحلوي علي ٥٥٥	۱۰ د کي انسوان (۱۶) مسبيحه ا
	ر طبيق قاعدة الطور تكون قيمة ال (F) =	ے) 0 1600° م بتد در جة حر ار ة 1600° م بتد	التي تحتوي على 50%	، ١٨ ـ في السؤال (13) للسبيكة
	(1) 0 1, 03 1, 05	Page 1 of 8	7- C-P	+1
			2-1	+1



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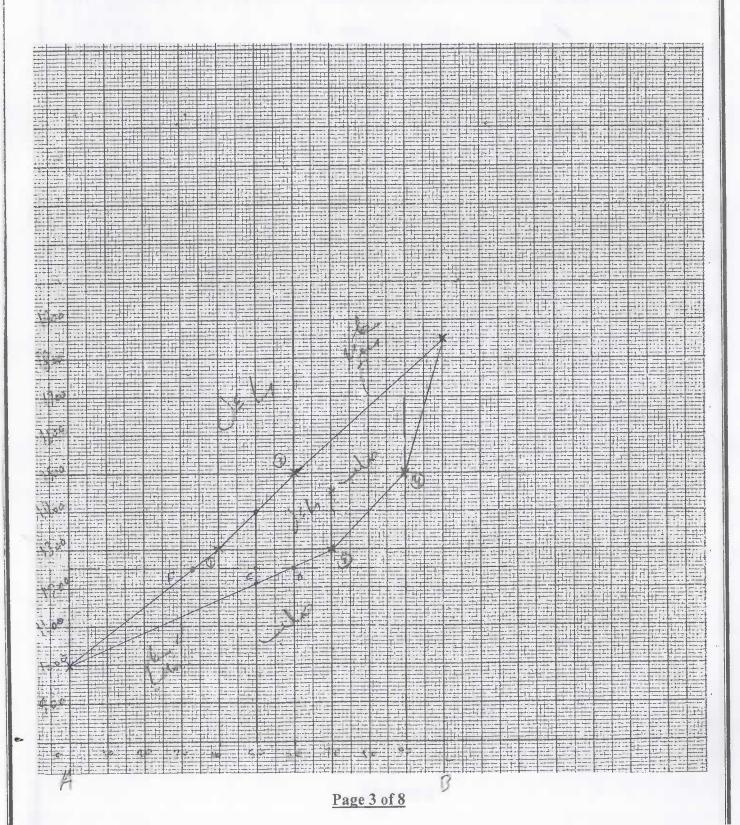
1 (

			3 (2		5) 0	2 (1 (1	
19- Gaseous F	uel used i	n a furnace	Its Composit	ion as the	following	:			
Element	С	H ₂	O ₂	S	N ₂	H ₂ O	ash		
% by weight	89%	3%	2%	1%	2%	2%	1%		
The weight of combustion) = a) 26 20- In the que combustion a) 26 21- In the que hundred k a) 32 22- In the que kilogram: a) 3 23- In the que hundred k a) 1 24- In the que	estion (19) from that 127 estion (19) from that 127 estion (19) ilogram fr	b) 261 b) 261 c) the weight the weight fuel comple that fue b) 238 the weight fuel comple comple that fuel comple that fuel	c) 1135 at of air need c) 1135 ght of carbo el complete co of water value combustio 9 c) th of sulphu el complete co	on dioxidombustion) 251 pour prod n) = 24 r dioxide pubustion	d) 864 In one hun d) 864 Ile produced n) = d) 1135 Iluced in con	dred kilogra. H1 + 202 2 ? 21 d in combus mbustion production d in combus Kg	m from that If the state of th	ts (burning or 64°) fing one hundre	te
a) 1: Question (2) Write (v) for 1. Combusti	the true	statement emical reac	and write (x)	c) 120 ₄) for the an oxidar	false senter	nce in the ar			
2. Material l	palance eq	uation can	be done on ch	nemical p	rocess as th	ne form the ir		rocess equal th مثال علي الحيود	
مدي درجات	كربونية في	مذيبات الهيدرو	يد الكربون في الم	ن وثاني أكس	غازي الارجور	ذوبانية كلا من . ٣ ° كلفن لا 6	ة الحرارة تزداد ٥٢ كلف الـ ٣٠	کلما زادت درج الحدادة من ۸۸	,0
			Y.	في السوائل	يانية الغازات ا زاج . حدم الضغط ما	قانون هنري للذو ائل العديمة الإمتز الإمات بذرار الح	في الماء يتبع ف ولت علي السوا در عن قادت را	السلوك المثالي لد ذوبان الأكسجين لينطبق قانون راؤ في الحيود الموج في الحيود الموج النقي . إلى	.V
		باني .(م الكبريت . (م)	ارة .(/) عن المركب الكيميا مادر ،ثاني اكسيد	ي . [/] درجة الحر لك تختلف ع وجين ، النش	ي للسائل النقر والضغط وتقل اتها متغيرة وبذ كلوريد الهيدر لاسيتون. \	ن الضغط البخار ولت يقل الحجم كون نسب مكونا ان في الماء غاز الكلور وفورم و ا	للمحلول أكبر م بعن قانون راؤ اليط متجانسة وت الأتية شره الذوب الموجب خليط	. الضغط البخاري . في الحيود السالب . المحاليل هي مخ . كلا من الغاز ات . مثال علي الحيود	11 15
، مثل جميع	وبان في الماء	عن طريق الذ			لابد أو لا من ت	صلب في صلب	حاليل من النوع	. للحصول علي م السبائك بر إتحاد أكسيد الكالس	17
						مصاص کی	لمح تقل عملية الإد	. بزيادة مساحة السم	1 7
سائل النقي . 📉								. في الحيود السالب 14/16hos	١٦
	Ena	of first p	art questic	ms			Dest	VVISILES	





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Course Title	Engineering Chemistry	Discol D		
Date	17/1/2022	Final Exam	Course Code	PME0104
		Model no. ckm253	Allowed time	3 hours
Part two:	Answer the following of	uestions in the el	ectronic sheet	
B. The C. The E. No.	f the following processes also essystem loses heat and does esystem gains heat and does esystem loses heat and has esystem gains heat and has esystem gains heat and has not of these is always true.	s work on the surroung work on the surroung work done on it by the surroung work done on it by the	dings. dings. e surroundings. e surroundings.	
TO.O atm	ompressed in a cylinder from . Calculate the amount of we	ork done on the syste	2.0 L by a consta m.	nt pressure of
A. 1.0	$1 \times 10^4 \text{J}$ B180 J C.	1.84 ×10 ⁴ J	$1.81 \times 10^4 \text{J}$	E.180J
B. Perj C. Ene D. Ene	to the first law of thermody orgy is neither lost nor gained petual motion is possible. orgy is conserved in quality by orgy is being created as time of when time began.	d in any energy transi		iverse now
A. $O_2(g$	hese processes is endotherm $g(g) + 2H_2(g) \rightarrow 2H_2O(g)$ $g(g) + 2CH_3OH(g) \rightarrow 2CO_2(g)$	B. $H_2O(g) \rightarrow$)
9. An endothe	ermic reaction causes the sur	rroundings to		$\rightarrow H_2O(1)$
A. warı	m up. 🔀 become acid	ic. C. condense.	M.decrease in ter	nperature.
0. An exother	mic reaction causes the surrup. B. become acidic. C	oundings to . expand. D. deci	ease its temperatu	ire
1. 4. A samp constant p A. 2.94	ole of nitrogen gas has a volu pressure. What is the final vo L B. 19.3 L C. 31.4 I	ume of 32.4 L at 20°C plume of nitrogen? L D. 54.5 L	E. 356 L	d to 220°C at
2. A sample o expand at A. 10°C	f N ₂ gas occupies 2.40 L at 2 constant pressure, at what to B. 40°C C. 146°C	emperature will the N	a container that ca 2 occupy 4.80 L? E. 685°C	n contract or V
3. If the presso what facto A. 8	ure of a gas sample is quadruor does the volume of the sar B. 2 C. 1/2 D.	upled and the absolutemple change? 1/4 E. 1/8	e temperature is de	oubled, by

34. A mixture of gases commin- 445 mules of neaon (Ne) . 0.74 mole of argon (Ar) and 2 15



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moles of xenon (Xe). Calculate the partial pressures of the argon (Ar) gas if the total
pressure is 2.00 atm at a certain temperature.
[a] 0.10 atm [b] 0.586 atm [c] 0.20 atm [d] 1.21 atm
35.Calculate the number of liters of carbon dioxide measured at STP that could be produc from 7.45 g of propane. C ₃ H ₈ A) 1.90 L CO2 B) 3.80 L CO2 C)12.5 L CO2 D)11.4 L CO2

36. Samples of the following volatile liquids are opened simultaneously at one end of a room. If you are standing at the opposite end of this room, which species would you smell first?[Assume that your nose is equally sensitive to all these species.

ethyl acetate (CH ₃ COOC ₂ H ₅)	b. camphor $(C_{10}H_{16}O)$
naphthalene (C ₁₀ H ₈)	. d. diethyl ether (C2H5OC2H5
it(s) of free energy change ΔG° is(are)	 1·K-1 D. J·K·mol-1

38. During the interaction between the system and the surrounding the amount of energy gained by the system must be exactly equal to the amount of energy lost the surrounding.

c. Third law of thermodynamic d. Zero law of thermodynamic d. Zero law of thermodynamic

39. They are related to the molecular structure of a system and the degree of the molecular activity.

h a macroscopic form of energy.

a. microscopic form of energy.
c. Chemical energy.
b. a macroscopic form of energy.
d. a&c

41. The half cells are interconnected through.

40. Greater value of standard reduction potential greater will be tendency A.to get oxidized B. to get reduced C. accept electrons b. both b and c

A. Wire P. salt bridge P. clectric circuit P. no connection exists P. salt bridge P. salt bridge P. salt bridge P. salt bridge P. no connection exists

42. What is P0 per mole of dichromate ions for the reduction of dichromate ions, P1. 36 P2 to P3 by bromide ions, P3, in acidic solution in galvanic cell? (Hint: Use the standard cell potential.)

(a) +26.3 kJ (b) -158 kJ (c) +158 kJ (d) -26.3 KJ

43. The amount of heat required to rise the temperature of 1lbm of distilled water 1°F

a-Specific heat b-Btu c-Calory A-Heat capacity

44. The total entropy of a mixture of gases is the ____ of the partial entropies.

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) average	b) weighted mean	c) Sum	d) difference of the highest and the lowest
) avoidge	D YYOLETICOUT	Of Stall	er) difference of the fire and the formation

45. The Chemical Composition of a sample of cement are as the following: (loss 0.81%, SO₃ 2.37%, MgO 0.79%, Fe₂O₃ 3.11%, Al₂O₃ 4.74%, SiO₂ 23.44%, CaO 64.74%). Calculate the weight % of the following compounds: the Silica modulus equal

A. 1 B. 1.52 C. 2.07

46.From the previous problem (45) calculate the alumina modulus?

A. 1.52 B.1 C. 2.99 D. 2.07

A+1

47. From the problem no.(45) calculate the hydraulic modulus?

A. 1 B. 2.99 C.1.52 Ø. 207

49. Sand added to adjust the composition of the mixture used in the manufacture of cement t reach % SiO2 =......in the Cement. A. 11% B. 21% £.22% D. 12%

50. The choose of the suitable method for the production of cement depends on.....

a. type of the raw materials b. the availability of the fuel. c. quality of the raw materials A.All the previous

51. If the amount of Al₂O₃, the burning of cement will occur attemperatur and the produced cement will be fast -hardening.

A. decreases -high C. increases -low D. decreases -low

52. If carbon dioxide molecules effuse at an average rate of 5 mol/s, at what rate would diatomic hydrogen molecules effuse in the exact same conditions?

53. Choose the substance with the higher entropy per mole at a given temperature: CO₂(g) or CO₂(aq).

 $A. CO_2(g)$. d. b. $CO_2(g) & CO_2(aq)$.

e

C. CO2(s). D. CO₂(aq)

54. Consider an electrochemical cell constructed from the following half cells, linked by an external circuit and by a KCl salt bridge. • an Al(s) electrode(anode) in 1.0 M Al(NO₃)₃ solution • a Pb(s) electrode(cathode) in 1.0 M Pb(NO₃)₂ solution. The balanced overall (net) cell reaction is

55. Consider an electrochemical cell based on the following cell diagram: $Pt \mid Pu^{3+}(aq), Pu^{4+}(aq) \parallel Cl_2(g), Cl^{-}(aq) \mid Pt$

Given that the standard cell emf is 0.35 V and that the standard reduction potential of

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chlorine is 1.36 V, what is the standard reduction potential E°(Pu ⁴⁺ /Pu ³⁺)? A.2.37 V B.1.01 V C1.71 V D1.01 V
Question(2): $0.35 = 1.36 + \times$
Write $()$ for the true statement and write (x) for the false sentence in the answer sheet
20. The critical temperature in the pressure – volume diagram Upon which are drawn isothermal of CO curves is 31 °C
26. The least amount of the air needed to burn 29 Kg from butane C ₄ H ₁₀ is. 104 Kg (incomplete combustion)(X)
 27. Adiabatic changes mean that: It is the process in which the system does not gain or loss heat. It is closed system
32. When the combustion be incomplete: part of carbon converted to carbon dioxide and the rest to carbon monoxide, all hydrogen converted to water and all sulphur converted to sulphur dioxide
 33. Atmospheric air consists of . 21% O₂ & 79% N₂ by weight
 35. The important factors which may influence the corrosion process are: Nature of the metal, nature of the environment and the corrosion products & Temperature only. 36. Inhibitors: They are Chemical substances added to the corrosive solution in a small amount (e.g.0.3%).
37. Passivators, such as hydrazine (N ₂ H ₄) these substances takes O ₂ from the corrosive solution(X)

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S - July





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Prof. Dr. Mona Ahmed Darweesh Dr. Wafaa Ahmed Hammad
End of questions Best Wishes Prof. Dr. Mona Ahmed Darweesh Dr. Wafaa Ahmed Hammad
The compounds which are responsible for final strength of Cement is Tricalcium silicate & Tricalcium Aluminate
to form C4AF
. Reactions inside the rotary kiln (furnace), Part of Iron oxide reacts with Al ₂ O ₃ and CaO
cement, The cement damaged and exposed to cracking(V)
The passive layer formed on the reinforcement steel is a Layer of the iron oxides and hydroxides formed on the reinforcement steel as a result of exposing it to the atmospheric oxygen
In the metallic coating: Coating with more Nobel metal must be free from cracks or pores (like Cu)
Temporary Coating is not one of the Methods of protecting metals against corrosion(X)
Corrosion of Steel of Reinforcement in Concrete
an organic solvent
i. Metals above H ₂ in the e.m.s do not dissolve in acids (known by Nobel metals)because it is difficult to loss their electrons and difficult to convert into ions
the porosity of the concrete, This is the most common reason which causing Corrosion of Steel Reinforcement in Concrete
R. Anodic inhibitors are substances such as Na ₂ CO ₃ that react with the anodically formed Fe ions to form insoluble iron carbonate which deposit on the anode and isolate it from the corrosive medium

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Reduction reaction of metal	Standard reduction potential: E° (V)
$Au^+ + e^- \Rightarrow Au(s)$	1.83
$Au^{3+} + 2e^- \rightleftharpoons Au^+$	1.36
$Au^{3+} + 3e^- \rightleftharpoons Au(s)$	1.52
$AuCl_4^- + 3e^- \Rightarrow Au(s) + 4Cl^-$	1.002
$Fe^{2+} + 2e^{-} \Rightarrow Fe(s)$	-0.44
$Fe^{3+} + 3e^{-} \rightleftharpoons Fe(s)$	-0.037
$Fe^{3+} + e^{-} \rightleftharpoons Fe^{2+}$	0.771
$Mn^{2+} + 2e^- \Rightarrow Mn(s)$	-1.17
$Mn^{3+} + e^- \rightleftharpoons Mn^{2+}$	1.5
$MnO_2(s) + 4H^+ + 2e^- \rightleftharpoons Mn^{2+} + 2H_2O(1)$	1.23
$MnO_2(s) + 4H^+ + e^- \rightleftharpoons Mn^{3+} (aq) + H_2O(I)$	0.95
$MnO_4^- + 4H^+ + 3e^- \Rightarrow MnO_2(s) + 2H_2O(1)$	1.70
$MnO_4^- + 8H^+ + 5e^- \rightleftharpoons Mn^{2+} + 4H_2O(1)$	1.51
$Ag^+ + e^- \rightleftharpoons Ag(s)$	0.7996
$AgBr(s) + e^- \rightleftharpoons Ag(s) + Br^-$	0.071
$Ag_2C_2O_4(s) + 2e^- \rightleftharpoons 2Ag(s) + C_2O_4^{2-}$	0.47
Ga ³⁺ + 3e−⇒Ga(s)	-0.56
$Cu^+ + e^- \rightleftharpoons Cu(s)$	0.520
$Cu^{2+} + e^- \rightleftharpoons Cu^+$	0.159
$Cu^{2+} + 2e^- \rightleftharpoons Cu(s)$	0.3419
$Br_2 + 2e^- \Rightarrow 2Br^-$	1.087
$HOBr + H^+ + 2e^- \Rightarrow Br^- + H_2O(1)$	1.341
$Cr^{3+} + e^- \rightleftharpoons Cr^{2+}$	-0.424
$Cr^{2+} + 2e^- \Rightarrow Cr(s)$	-0.90
$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightleftharpoons 2Cr^{3+} + 7H_2O(1)$	1.36
$Mg^{2+} + 2e^- \Rightarrow Mg(s)$	-2.356
$Mg(OH)_2(s) + 2e^- \Rightarrow Mg(s) + 2OH^-$	-2.687
$Al^{3+} + 3e^- \rightleftharpoons Al(s)$	-1.676
$AI(OH)_4^- + 3e^- \Rightarrow AI(s) + 4OH^-$	-2.310

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Physical and Mathematical Engineering Department 24 25= Ozneoded= Faculty of Engineering Tanta University **Final Exam** Course Code PME0104 Course Title | Engineering Chemistry Model no. Allowed time 3 hours 17/1/2022 kcw355 Part one: Answer the following questions in the electronic sheet 02 23 77 First Question: Choice the correct answer: 1- Gaseous Fuel used in a furnace Its Composition as the following: 7 261 N_2 H₂O Element ash 2 = 87 89% 3% 2% 1% 2% 2% 1% % by weight The weight of oxygen needed from the air needed to burn one hundred kilogram from that fuel (complete combustion) =Kg a) 263 c) 1135 d)864 2- In the question (1) the weight of air needed to burn one hundred kilogram from that fuel (complete combustion) =Kg c) 1135 d) 864 a) 263 b) 261 3- In the question (1) the weight of carbon dioxide produced in combustion products (burning one hundred kilogram from that fuel complete combustion) =Kg b)238 c) 251 d) 1135 4- In the question (1) the weight of water vapour produced in combustion products (burning one hundred kilogram from that fuel complete combustion) =Kg c)24b) 29 a) 327 5. In the question (1) the weight of sulphur dioxide produced in combustion products (burning one hundred kilogram from that fuel complete combustion) =Kg Gez ->317 b) 0.5 c) 2 d) 0.3 a) 1 501-71 6- In the question (1) the total weight of combustion products (dry products burning one hundred kilogram 11: - 373 from that fuel complete combustion) =Kg c) 1204.5 d)1206.5 a) 1233.5 b) 1231.5 7- A mixture containing 40% benzene (B) and toluene (T) by mass is fed to a distillation column by a rate P 2000 Kg/hr. An overhead stream of 98wt% B is produced, and 95% of the Toluene leaves in the bottom stream. The rate of the vapor leaved from the top of the distillation column was four times of the amount 980 of the distillate. Assuming basis is one hour The amounts of distillate leave the condenser to be final product =Kg 400/08 a) 753 c)1247 d) 3012 b) 2000 8- In the question (7) the amount of Benzene in the distillate =Kg c)2000 d) 15 a) 753 b) 738 Pr 9- In the question (7) the amount of the bottom product = Kg 950/ b) 3012 c)2000 d) 1247 40×2000-98(2000-12)+5P 50/08 c) 1184) b)1247d) 63 11- In the question (7) the amount of vapor leave the top of the distillation column product =Kg

a) 2000 b) 3012 c)1184 d) 1247 8000 = 196000 - 982 + 52 d) 1247 b) 3012 c)1184 12- In the question (7) the amount of liquid leave the condenser =Kg -93P = -116000 c) 2000 d) 1247 a) 2259 b) 3012 Pz = 1247.3 13- In the question (7) the returned ratio (R) = PI=752.633

b) 2

c) 1

د) لا توثر

ب) المولالية (ج) العيارية د) المولارية

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١٤ - محلول يتكون من كلوريد الصوديوم تركيزه ٥ جرام مكافئ / لتر طريقة التعبير عن التركيز هنا هي

ج) متساوية

١٥ عند ذوبان مادة صلبة في سائل فإن درجة التجمد للمحلول الناتج تكونمقارنة بالسائل النقي.

ا) طريقة وزن الحجم

L= V-D=4D-D = 30



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د) لا تؤثر	۱۹ عند ذوبان مادة صلبة في سائل فإن درجة الغليان للمحلول الناتج تكون ۱۲ عند ذوبان مادة صلبة في سائل فإن درجة الغليان للمحلول الناتج تكون ۱۷ جرام جزيئي / لثر هي أحد وحدات التعبير عن التركيز وهي وحدة قياس أ) طريقة وزن الحجم ب) المولالية ج) العيارية
And when the second sec	عدد الجرامات المذابة في 1000 جرام مذيب
	عدد الجرامات المذابة في 1000 جرام مذيب الموزن الجزيئي
د) المولارية	 ا) طريقة وزن الحجم (ب) المولالية] ج) العيارية
لامتزاج في حالتي الصلب و المصهور ، وتبدأ السبيكة	١٩- معدنان أ درجة إنصهار (1000 مم، ب درجة الصهار و 1850 م، تأما ١١
مادة صلبة تحتوي على 70% "ب" في حين تبدأ السبيكة	المحتوية على 60% أفي التَّجمد عند درجة حرارة 1300 م وتنفصل منها
مادة صلبة تحتوي علي 90% "ب". للسبيكة التي تحتوي	المحتوية على 40% آ في التجمد عند درجة حرارة 1500 كم وتنفصل منها ،
	على 50% أ درجة بداية التجمد =
1210 (2	1850 (= 1000 (- 1400 (
1000.6	٠٢٠ في السوال (١٩) للسبيكة التي تحتوي على 50% ا درجة نهاية التجمد =
1000 (2	1850 (- 1210 (-) 1400 (1
ه م يدون نركيب السيبيكة عباره عن حليط من صلب	٢١- في السوال (19) للمبيكة التي تحتوي على 50% أعند درجة حرارة 1250 ومصهور ويكون تركيب المادة الصلبة فيها =
1.6 2.2 41 (s	50 (= \[\frac{32(\sqrt{1})}{68} \]
و يكون تركيب السيبكة عيارة عن خابط من صل	اً) 68 (<u>ب) 32</u> ج) 59 ٢٢- في السؤال (19) للسبيكة التي تحتوي على 50% ا عند درجة حرارة 1250°
01 - <u></u> 01 19 19 19 19 19 19 19 19 19 19 19 19 19	ومصهور ويكون تركيب المصهور فيها = (أ)
32 (১	59 (
° م بتطبيق قاعدة الطور تكون قيمة ال (F) =	٢٢- في السؤال (19) للسبيكة التي تحتوي على 50% أ عند درجة حرارة 1250°
3 (2	ر أ) 1 (ب) 2 ج) 0 ح. ٢٤ في السوال (19) للسبيكة التي تحتوي علي 50% أ عند درجة حرارة 1600°
° م بتطبيق قاعدة الطور تكون قيمة ال (F) =	٢٤- في السوال (19) للسبيكة التي تحتوي علي 50% أعند درجة حرارة 1600°
3 (১	0 (()
Question (2):	134444444444444444444444444444444444444
Write $()$ for the true statement and write (x) for the false sentence in the answer sheet
	and find and find (1)
1. Combustion is a chemical reaction between	chemical process as the form the input to the process equal the
2. Material balance equation can be done on output of the process. (L)	chemical process as the form the input to the process equal the
3. Atmospheric air consists of 77% N ₂ and 21	3 % Oa by volume
· ·	٤. مثال على الحيود السالب محاليل الماء والميثانول (١)

كلما زادت درجة الحرارة تزداد ذوبانية كلا من غازي الارجون وتاني اكسيد الكربون في المذيبات الهيدروكربونية في مدى درجات

الحرارة من ٢٨٨ · كلفن إلى ٣٠٣ · كلفن بل) السلوك المثالي للسوائل هو عبارة عن السلوك الذي تتساوي فيه جميع قوى التجاذب مابين المكونات وبعضها وبين السوائل النقية (٠)

ذوبان الأكسجين في الماء يتبع قانون هنري للذوبانية الغازات في السواتل بلا)

ينطبق قانون راؤولت على السوائل العديمة الإمتزاج 📈

المحاليل هي مخاليط متجانسة وتكون نسب مكوناتها متغيرة وبذلك تختلف عن المركب الكيمياني (1)

كلا من الغازات الأتية شره الذوبان في الماء غاز كلوريد الهيدروجين ، النشادر ، ثاني أكسيد الكبريت ب(ع)

١١. مثال على الحيود الموجب خليط الكلوروفورم و الاسينون. 🖄

١٢. للحصول على محاليل من النوع صلب في صلب لابد أولا من تحويل المادة الصلبة إلى سائلة عن طريق الذوبان في الماء مثل جميع

١٢. في الحيود الموجب عن قانون راؤولت يزداد الحجم والضغط وتزداد درجة الحرارة (ل)

١٤. في الحيود الموجب يحدث تنافر بين جزينات المحلول وتكون قوى التجاذب بين جزينات المحلول أكبر من قويالتجاذب بين جزينات السائل

10. الضغط البخاري للمحلول أكبر من الضغط البخاري للسائل النقي بر) 17. في الحيود السالب عن قانون راؤولت يقل الحجم والضغط وتقل درجة الحرارة بر) 14. إتحاد اكسيد الكالسيوم مع ثاني أكسيد الكربون إحدي صور ذوبان المادة الصلبة في الغازات (م) 14. بزيادة مساحة السطح تقل عملية الإدمصاص (م)

١٩. في الحيود السالب يحدث تنافر بين جزينات المُحلُول وتكون قوي التجاذب بين جزيئات المحلول أقل من قوي التجاذب بين جزيئات المعائل النقى 💢

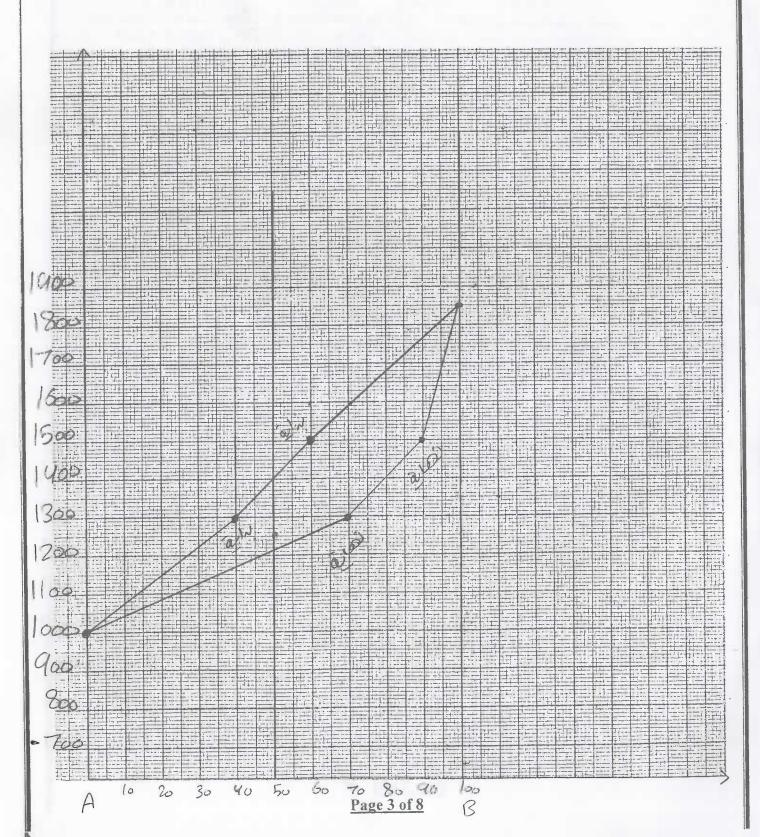
End of first part of questions

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Olehenzoulal, 302





Course Title				
	Engineering Chemistry	Final Exam	Course Code	PME0104
Date	17/1/2022	Model no. CLM253	Allowed time	3 hours
Part two:	Answer the following q	uestions in the e	electronic sheet	
A. O ₂ C. 3O 6. An endotl A. wa 7. Which A. Th B. Th C. Th	of these processes is endothe $(g) + 2H_2(g) \rightarrow 2H_2O(g)$ $h_2(g) + 2CH_3OH(g) \rightarrow 2CO_2(g)$ hermic reaction causes the sum up. B. become acid of the following processes and easystem loses heat and does the system gains heat and does the system loses heat and does the system loses heat and has we	B. H ₂ O(g) – g) + 2H ₂ O(g) rroundings to ic. C. condense ways results in an in work on the surrous work on the surrous work done on it by the	D H ₂ Oo D decrease in the ener ndings. ndings. he surroundings.	
E. No 8. A gas is c	e system gains heat and has we ne of these is always true. compressed in a cylinder from a. Calculate the amount of wo	a volume of 20 L t	o 2.0 L by a const	ant pressure of
A. 1.0	$1 \times 10^4 \mathrm{J}$ B180 J C. 1	.84×10 ⁴ J D	$-1.81 \times 10^4 \mathrm{J}$	Е.180Ј
A. End B. Per C. End D. End	to the first law of thermody, brgy is neither lost nor gained petual motion is possible. Brgy is conserved in quality bergy is being created as time to when time began.	in any energy trans ut not in quantity.		niverse now
, t			NS =	
3 1	rmic reaction causes the surr up. B. become acidic. C		crease its temperate	ture
	tup. D. occome acidic.			T.
(A) warm	ple of nitrogen gas has a volupressure. What is the final volume B. 19.3 L C. 31.4	me of 32.4 L at 20° olume of nitrogen?	PC. The gas is heat E. 356 L 32 4	ed to 220°C at
(A) warm 1. 4. A sam constant A. 2.94 2. A sample expand a	ple of nitrogen gas has a volu pressure. What is the final vo	olume of 32.4 L at 20°C. If the gas is in the compensature will the	E. 356 L 32 4	tan contract or
(A) warm constant A. 2.94 2. A sample expand a A. 10%	ple of nitrogen gas has a volupressure. What is the final volume of N ₂ gas occupies 2.40 L at a constant pressure, at what to C B. 40°C C. 146°C gure of a gas sample is quadror does the volume of the same	olume of 32.4 L at 20° clume of nitrogen? D. 54.5 I 20°C. If the gas is in the emperature will the D. 313°C	E. 356 L 32 1/2 n a container that	can contract or $\frac{1}{2}$



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34. A mixture of gases contains 4.46 moles of neaon (Ne) . 0.74 mole of	argon (Ar) and 2.15
moles of vanon (Va) Calculate the west'd	
pressure is 2.00 atm at a certain temperature. [a] 0.10 atm [b] 0.586 atm [c] 0.20 atm [d] 1.21 atm	= 0.74
[a] 0.10 atm [b] 0.586 atm [c] 0.20 atm (d] 1.21 atm	0.74 + 215+ 4.46
35.Calculate the number of liters of carbon dioxide measured at STP that from 7.45 g of propane. A) 1.90 L CO2 B) 3.80 L CO2 C)12.5 L CO2 D)11.4 L CO2	t could be produced C3H8+52
36. Samples of the following volatile liquids are opened simultaneously	3
If you are standing at the opposite end of this room, which species would	
first?[Assume that your nose is equally sensitive to all these species. a. e	
(CH ₃ COOC ₂ H ₅) b. camphor (C ₁₀ H ₁₆ O)	ethyl acetate mol 3m 7.45 ×
	2H5OC2H5)
 37. The unit(s) of free energy change ΔG° is(are) A. J·mol-1 B. J (C. J·mol-1·K-Γ) D. J·K 38. During the interaction between the system and the surrounding the ar 	2H ₅ OC ₂ H ₅) = -mol-1 mount of energy gained
by the system must be exactly equal to the amount of energy lost the surr	rounding.
a. First law of thermodynamic b. Second law of thermody	namic
c Third law of thermodynamic d. Zero law of thermodynamic	dynamic
39. They are related to the molecular structure of a system and the degree activity. a. microscopic form of energy. b. a macrosc c. Chemical energy. d. a&c 40. Greater value of standard reduction potential greater will be tendence. A.to get oxidized B. to get reduced C. accept electrons D. both b	opic form of energy.
41. The half cells are interconnected through. A. Wire B. salt bridge no connection exists 42. What is Go per mole of dichromate ions for the reduction of dichro Cr³+ by bromide ions, Br⁻, in acidic solution in galvanic cell? (Hint: Use potential.) (a) +26.3 kJ (b) -158 kJ (c) +158 kJ (d) -26.3 kJ 43. The amount of heat required to rise the temperature of 11bm of distillation.	mate ions, Cr ₂ O ₇ ² , to the standard cell
a-Specific heat b-Btu c-Calory d-Heat cap 44. The total entropy of a mixture of gases is the of the partial entropy as average b) weighted mean c) sum d) difference of the highest at 45. The Chemical Composition of a sample of cement are as the followin 2.37%, MgO 0.79%, Fe ₂ O ₃ 3.11%, Al ₂ O ₃ 4.74%, SiO ₂ 23.44%, CaO the weight % of the following compounds the Silica modulus eq 1.52 C. 2.07 D. 2.99	opies. and the lowest g: (loss 0.81%, SO ₃ 64.74%). Calculate
Fe203+A1-03	





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46.From the previous problem (45) calculate the alumina modulus? A. 1.52 B.1 C. 2.99 D. 2.07
47. From the problem no.(45) calculate the hydraulic modulus?
A. 1 B. 2.99 C.1.52 D. 207 2.069
48. Lime Stone is one from Raw materials used in the manufacture of cement: which is consider as a source
of
49. As the cell given below operates, the strip of silver gains mass (only silver) and the concentration of silver ions in the solution around the silver strip decreases, while the strip of lead loses mass and the concentration of lead increases in the solution around the lead strip. Which of the following represents the reaction that occurs at the negative electrode in the above cell? Pb/Pb(NO ₃) ₂ (1.0 M) AgNO ₃ (1.0 M) / Ag
(a) $Pb^{2+} + 2e^{-} Pb \times Pb/Pb^{2}$ (IM) II Ag^{+} (IM) $II Ag^{+}$
(a) $Pb^{2+} + 2 e^{-} Pb \times Pb/Pb^{2}$ (1M) II Ag^{+} (1M) Ag^{+} (
آسود کاشود
50. For a voltaic (or galvanic) cell using Ag, Ag ⁺ (1.0 M) and Zn ²⁺ (1.0 M), Zn half-cells, which of the following statements is incorrect?
(a) The zinc electrode is the anode. —
(b) Electrons will flow through the external circuit from the zinc electrode to the silver electrode.
(d) The mass of the zinc electrode will decrease as the cell operates.
51. Consider the standard voltaic (or galvanic) cell: Fe,Fe ²⁺ versus Au,Au ³⁺ . Which answer identifies the
cathode and gives the E^0 for the cell?
52. What is the reduction potential for the half-reaction at 25° C: $Al^{3+} + 3e^{-\frac{1}{2}} Al$ if $[Al^{3+}] = 0.10 \text{ M}$ and $E^{\circ} = 1.66 \text{ V}$?
52. What is the reduction potential for the half-reaction at 25° C: $Al^{3+} + 3e^{-\frac{1}{2}} Al , \text{ if } [Al^{3+}] = 0.10 \text{ M} \text{ and } E^{\circ} = -1.66 \text{ V}?$
Al ³⁺ + 3e
53. Calculate the potential (in volts) for the voltaic (or galvanic) cell indicated at 25°C.
(a) 1.29 V (b) 0.97 V (c) 1.45 V $\sqrt{(d)}$ 1.23 V $\sqrt{(d)}$ 2.35 G (a) 1.29 V (b) 0.97 V (c) 1.45 V $\sqrt{(d)}$ 1.23 V $\sqrt{(d)}$ 54. Sand added to adjust the composition of the mixture used in the manufacture of cement t
(a) 1.29 V (b) 0.97 V (c) 1.45 V (d) 1.23 V
reach % SiO2 =in the Cement. A. 11% B. 21 % C.22% D. 12%
55. The choose of the suitable method for the production of cement depends on
a. type of the raw materials b. the availability of the fuel. c. quality of the raw materials
d.All the previous
56. If the amount of Al ₂ O ₃ , the burning of cement will occur attemperatur
and the produced cement will be fast -hardening.
A. decreases -high B. increases -high C. increases -low D. decreases -low
57. If carbon dioxide molecules effuse at an average rate of 5 mol/s, at what rate would diatomic
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nydroge	en molecules effuse in the exact same cond	itions?	
7	a) 23.5 mol/s \b) 4.7 mol/s c)110 mol/	s d)Not enough inf	ormation is provided
58. Cho	oose the substance with the higher entropy	oer mole at a given ter	nperature: CO ₂ (g) or
CO ₂ (aq)).		
	$CO_2(g)$. b. $CO_2(g)$ & $CO_2(aq)$.	C. CO2(s).	D. $CO_2(aq)$
-	parameter departs on the San San		0 11 11 1 11
59. Con	sider an electrochemical cell constructed f	rom the following half	cells, linked by an
ex	ternal circuit and by a KCl salt bridge. (NO ₃) ₃ solution	• an Al(s) electrode(a	inode) in 1.0 M
Al	I(NO ₃) ₃ solution (Al	-> Alts +50	X 2
	• a Pb(s) electrode(cathode) in 1.0 M Pt	$(NO_3)_2$ solution. The	balanced overall (net)
ce	Il monotion is	1 10>10	X S
A.	Pb(s) + Al ³⁺ (aq) \rightarrow Pb ²⁺ (aq) + Al(s),	B. $3Pb(s) + 2Al^3$	$^{+}(aq) \rightarrow 3Pb^{2+}(aq) +$
	0 A 1(-)		
C	$2AI(s)$. $3Pb^{2+}(aq) + 2AI(s) \rightarrow 3Pb(s) + 2AI^{3+}(as)$	q). D. $Pb^{2+}(aq) + A$	$a(s) \rightarrow Pb(s) + Al^{3+}(aq).$
60. C	onsider an electrochemical cell based on the hard, Pu ⁴⁺ (aq) Cl ₂ (g), Cl [*] (aq) Pt	e following cell diagra	am:
Pt Pu ³	+(aq), Pu ⁴⁺ (aq) Cl ₂ (g), Cl ⁻ (aq) Pt	0.35=1.36 -	100 7-
C	iven that the standard cell emt is 0.35 V an	d that the standard rec	Inchell hotellial or
cł	plorine is 1.36 V, what is the standard redu	ction potential E'(Pu'	'/Pu ³⁺)? A.2.37 V
LB	.1.01 V C1.71 V D.	-1.01 V	
-			
Questi	on(2):	***********************	>*********
		for the felse centence	in the answer sheet
Write	() for the true statement and write (x)	tor the laise sentence	THE WHO WILL SHOW
2	0. The important factors which may influen	nce the corrosion proc	ess are: Nature of the
4	metal, nature of the environment and the	corrosion products &	Temperature
	only	.(20).	
2	1 Inhibitors: They are Chemical substance	s added to the corrosi	ve solution in a small
	(0 = 0.29/)		
2.	2. Passivators, such as hydrazine (N2H4)	these substances takes	O ₂ from the corrosive
	colution		
2	2 Anodic inhibitors are substances such as	Na ₂ CO ₃ that react wi	th the anodically formed
	Fe ions to form insoluble iron carbonate	which deposit on the	anode and isolate it from
	the corrective medium		
2	4. Cathodic protection of underground stee	el pipeline is carried or	ut (externally using less
	Makal calvania anada (galvanic cell) /	n or Mg rod	
2	5 Drogence of differential agration oxygen	ation cells takes place	e due to me annerence m
	the porosity of the concrete. This is the	most common reason	Willell causing Collosion
	of Stool Dainforcement in Concrete		
2	26 Discimilar metal corrosion cells are set	up when two differen	t metals become in
	contact with each other in the presence	of an electrolyte	* * * * * * * * * * * * * * * * * * * *
2	The lass Nabel motels note as the anode	and the more Nobel 1	netals acts as the cathode
	where H2 evaluation takes place in the	electrochemical cell	
1	no Differential seration (ovvigenation) cells	his type of corrosic	on cens takes place
	whenever there is a difference in the di	ssolved UZ conc. Will	SIG Ozpool area acio ao ano
	anede and the O2 rich area act as the ca	thode	······································
	Dog	a A at h	





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29Chemical corrosion takes place due to direct attack by acids or alkalis(L)
 30. Metals above H₂ in the e.m.s do not dissolve in acids (known by Nobel metals)because it is difficult to loss their electrons and difficult to convert into ions
Corrosion of Steel of Reinforcement in Concrete
 34. Temporary Coating is not one of the Methods of protecting metals against corrosion
pores (like Cu)(4)
 36. The passive layer formed on the reinforcement steel is a Layer of the iron oxides and hydroxides formed on the reinforcement steel as a result of exposing it to the atmospheric oxygen
cement, The cement damaged and exposed to cracking
38. Reactions inside the rotary kiln (furnace), Part of Iron oxide reacts with Al ₂ O ₃ and CaO
to form C4AF
39. The compounds which are responsible for final strength of Cement is Tricalcium silicate & Tricalcium Aluminate
again
isothermal of CO curves is 31 °C
 43. The few amounts of hardness remain in water after water treatment processes, it activates the corrosion problems
44. The one-day strength of this cement is equal to the three-day strength of OPC with the same water-cement ratio, It is the High rapaid cement()
45. It is produced from the burning from the lime stone and Bauxite as a source of Aluminium oxides, it is Sea water Cement
46. Increasing the permeability of the concrete will allow to the carbon dioxide from air and chloride from solution to penetrate to the steel and decrease the pH(\(\forall\))
47. Adiabatic changes mean that: It is the process in which the system does not gain or loss heat. It is closed system
48 Kelvin - Planck statement of second it. at thermodynamic (No heat engine can have



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·
thermal efficiency100%)
49. For a given substance the entropy always increases in the following order: S (solid) < S (liq) < S (gas)
50. The critical temperature for carbon dioxide is 304 K. That means that no amount of pressure applied to a sample of carbon dioxide gas at or above 304K
51. Gas Effusion is a direct demonstration of gaseous random motion is provided by diffusion, the gradual mixing of molecules of one gas with molecules of another by virtue of their kinetic properties.
52. When the combustion be incomplete: part of carbon converted to carbon dioxide and the rest to carbon monoxide, all hydrogen converted to water and all sulphur converted to sulphur dioxide
53. Atmospheric air consists of . 21% O ₂ & 79% N ₂ by weight. 54. 2.5 moles of O ₂ is added to 5 moles of H ₂ , Number of moles of H ₂ O will it produce are 5 moles. End of questions. Best Wishes
Prof. Dr. Mona Ahmed Darweesh Dr. Wafaa Ahmed Hammad

Reduction reaction of metal	Standard reduction potential: E ° (V)
$Au^+ + e^- \rightleftharpoons Au(s)$	1.83
$Au^{3+} + 2e^- \rightleftharpoons Au^+$	1.36
$Au^{3+} + 3e^- \Rightarrow Au(s)$	1.52 €
$AuCl_4^- + 3e^- \rightleftharpoons Au(s) + 4Cl^-$	1.002
$Fe^{2+} + 2e^- \rightleftharpoons Fe(s)$	-0.44 €
$Fe^{3+} + 3e^{-} \rightleftharpoons Fe(s)$	-0.037
$Fe^{3+} + e^{-} \Rightarrow Fe^{2+}$	0.771
$Mn^{2+} + 2e^- \rightleftharpoons Mn(s)$	-1.17
$Mn^{3+} + e^- \rightleftharpoons Mn^{2+}$	1.5
$MnO_2(s) + 4H^+ + 2e^- \Rightarrow Mn^{2+} + 2H_2O(1)$	1.23
$MnO_2(s) + 4H^+ + e^- \rightleftharpoons Mn^{3+} (aq) + H_2O(I)$	0.95
$MnO_4^- + 4H^+ + 3e^- \Rightarrow MnO_2(s) + 2H_2O(1)$	1.70
$MnO_4^- + 8H^+ + 5e^- \Rightarrow Mn^{2+} + 4H_2O(1)$	1.51
$Ag^+ + e^- \rightleftharpoons Ag(s)$	0.7996 ←
$AgBr(s) + e \Rightarrow Ag(s) + Br$	0.071
$Ag_2C_2O_4(s) + 2e^- \Rightarrow 2Ag(s) + C_2O_4^{2-}$	0.47
Ga ³⁺ + 3e−⇒Ga(s)	(-0.56
$Cu^+ + e^- \rightleftharpoons Cu(s)$	0.520
$Cu^{2+} + e^- \rightleftharpoons Cu^+$	0.159
$Cu^{2+} + 2e^{-} \rightleftharpoons Cu(s)$	0.3419
$Br_2 + 2e^- \rightleftharpoons 2Br^-$	1,087
$HOBr + H^+ + 2e^- \rightleftharpoons Br^- + H_2O(1)$	1.341
$Cr^{3+} + e^- \rightleftharpoons Cr^{2+}$	-0.424
$Cr^{2+} + 2e = Cr(s)$	-0.90
$Cr_2O_7^{2-} + 14H^+ + 6e \Rightarrow 2Cr^{3+} + 7H_2O(1)$	(1.36)
$Mg^{2+} + 2e^- \rightleftharpoons Mg(s)$	-2.356
$Mg(OH)_2(s) + 2e^- \Rightarrow Mg(s) + 2OH^-$	-2.687
$Al^{3+} + 3e^- \rightleftharpoons Al(s)$	-1.676
$Al(OH)_4^- + 3e^- \rightleftharpoons Al(s) + 4OH^-$	-2.310 <
Zn	-0.76
Си	+0.34