
	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF ELECTRICAL ENGINEERING</b>				
	PROGRAM/ YEAR	(ELECTRICAL POWER) 2020-2021	SEMESTER	FIRST	
COURSE TITLE:	ELECTROMAGNETIC FIELDS (2)	COURSE CODE: EPM 206			
DATE:	21-3-2021	TOTAL ASSESSMENT MARKS:	70	TIME ALLOWED:	3 HOURS
					2 <sup>th</sup> -Year

- 1) Given is a flat ideal plate capacitor with the plate area  $A$ . the left plate ( $x=0$ ) has a potential  $V$  and the right plate ( $x=d$ ) has a potential zero. Between the two plates exists a medium with a place depending permittivity  $\epsilon(x) = \epsilon_0 + \epsilon_1 x/d$ . (10 marks)
- Set up the differential equation which satisfies the potential in the field space of the plate capacitor with the given space dependence of  $\epsilon$ , if the dielectric has a given volume charge  $\rho_v(x)$ .
  - The field space between the two plates has such a volume charge density, that the  $E$  between plates becomes independent from the space. Calculate  $\rho_v$ ,  $\Phi$ ,  $E$ ,  $D$ .
  - The field space between the two plates will have a constant electric flux density  $D$ , calculate  $\rho_v$ ,  $\Phi$ ,  $E$ ,  $D$ .

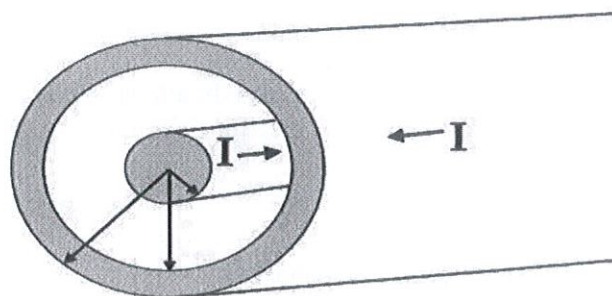
- 2-a) Two infinite length concentric and conducting cylinders of radius  $a$  and  $b$  are located on the  $Z$  axis with  $V=V_0(v)$  at  $r=a$  and  $V=0(v)$  at  $r=b$ ,  $b>a$ . Find: a)  $V$ ,  $E$ ,  $D$  (5marks)
- b)  $\rho$  on both conductors c)  $Q$  on each conductor d) Capacitance of length  $L$  of cylinder

$$\nabla^2 V = \frac{1}{r} \frac{\delta}{\delta r} \left( \frac{\delta v}{\delta r} \right) + \frac{1}{r^2} \frac{\delta^2 v}{\delta \theta^2} + \frac{\delta^2 v}{\delta z^2}$$

- 2-b) find the inductance and capacitance for a coaxial cable with inner radius  $R_1$  and outer radius  $R_2$  (5marks)

- 2-c) A copper wire of circular cross section carries a current of 1 Amp. Show that the magnetic energy within the wire is equal to  $\mu/16\pi$  joule/mt length. (5marks)

- 3-a) Through the use of Ampere's law Find magnetic field intensity  $H$  in all the regions of an infinite length coaxial cable carrying an equal current  $I$  in opposite directions in inner and outer conductors as shown. (10marks)



With my best wishes  
Dr. Ramadan Aly

4-a) Complete the missing parts (**write only the missing word in your answer paper**):

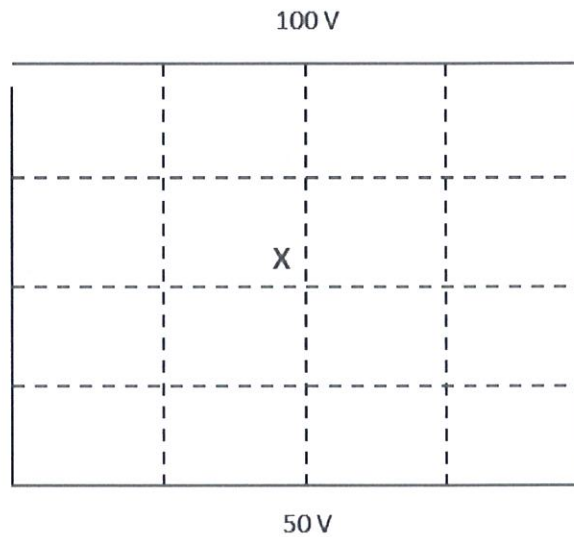
- 1- Laplace equation is used to determine the electric fields between two plates when....., however numerical techniques are used when .....
- 2- Maxwell equations in time varying are used to connect ....., ..... and.....

4-b) Deduce the numerical formula of iteration method used to determine the voltage between plates.

4-c) Magnetic field intensity of plan is given by: -  $H = (5XY^2t^2) a_x + (6YZ^3t^2) a_z$

Find:- the Magnetic field density, current density, electric field density, electric field intensity, and volume charge  $0 \leq X \leq 5, 0 \leq Y \leq 2, \text{ and } 0 \leq Z \leq 1$ ..... ( $\mu_r = 3.6$ ) and ( $\epsilon_r = 2$ )  $t = 4$  sec. **(15 marks)**

5-a) use the iteration method used to estimate the voltage at the following mesh points:


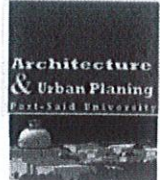


5-b) Write down Maxwell equations in time varying in Point and integral form

5-b) Electric field intensity is given by  $E = \{10 R^2 (\cos \Theta)(\sin \Phi) t\} a_R + \{5 (\sin \Phi)(\cos \Theta) t^2\} a_\Phi$   
 Find the magnetic field density, magnetic field intensity, electric current density.  $0 \leq R \leq 5, 0 \leq \Theta \leq 60^\circ, \text{ and } 0 \leq \Phi \leq 30^\circ$ ..... ( $\mu_r = 3.6$ ) and ( $\epsilon_r = 2$ )  $t = 2$  sec.

6-b) Electric current density  $J = 5\rho^3t^2 (\sin \Phi) a_\rho + 12 \rho z^2t^2 (\cos \Phi) a_\Phi$  pass in area  $0 \leq \rho \leq 4, 0 \leq \Phi \leq 45^\circ$ .  
 $Z = 4$  at time  $t = 3$  sec, find the electric field density and electric field intensity, magnetic field intensity, and magnetic field density. **(20 marks)**

**With my best wishes**  
**Dr. Khaled Arafa Aly**

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF ARCHITECTURE AND URBAN PLANNING</b>					
	PROGRAM/ YEAR	SECOND YEAR (ARCHITECTURE) 2017-18	SEMESTER	FIRST		
	COURSE TITLE:	HISTORY & THEORY OF ARCHITECTURE (3)	COURSE CODE:	ARC 212		
DATE:	28-02-2021	TOTAL ASSESSMENT MARKS:	45	TIME ALLOWED:	3 HOURS	FRESH

**( أجب على جميع الأسئلة الآتية موضحا إجابتك بالرسم كلما أمكن )**

**السؤال الأول:** في القرن التاسع عشر ظهر اتجاه معماري يدعو إلى الحدائثة و استخدام الحديد و الزجاج و لكن من وراء واجهات مقلدة من عصور قديمة - استشهد مع الشرح بأحد الأمثلة المعمارية التي تنطبق عليها هذه العبارة مع بيان وجهة نظرك في هذا الاتجاه. (8 درجات)

(9 درجات)

**السؤال الثاني:** اشرح بالرسم فقط كل مما يلي:

- 1- متحف برلين القديم.
- 2- مكتبة سانت جنيف - باريس.
- 3- صالة الماكينات بمعرض باريس الدولي.

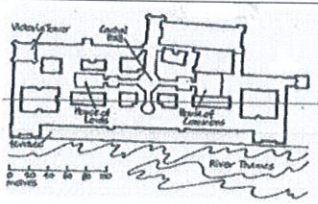
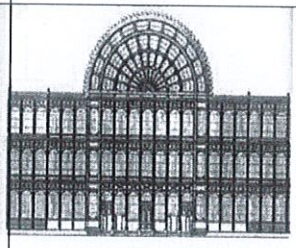
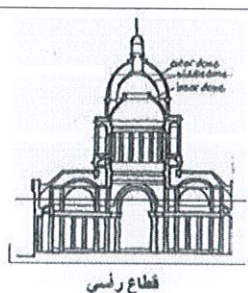

(6 درجات)

**السؤال الثالث:** وضح مع ذكر الأمثلة المعمارية المقصود بكل من:


1. - الحيز المناسب.
2. التصويرية القوطية
3. البعد المسافي في العمارة الانتقائية.

**السؤال الرابع:** اختلف تأثير الفنون و العماره من القرن الثامن عشر الي القرن التاسع عشر مما انتج اتجاهات معماريه مختلفه اشرح مع ذكر احد الاتجاهات المعماريه. (6 درجات)

**السؤال الخامس:** اذكر (اسم الشكل - المهندس المصمم - الاتجاه المعماري- أهم الأفكار) لكل مما يلي: (16 درجة)

شكل (4)	شكل (3)	شكل (2)	شكل (1)
			

مع أطيب التمنيات بالتوفيق، د / نانسي محمود بدوي

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF ELECTRICAL ENGINEERING</b>				
	<b>Program/ Year</b>	<b>2<sup>nd</sup> (Chemical Department ) 2020-2021</b>	<b>semester</b>		<b>First</b>
	<b>COURSE TITLE:</b>	<b>ELECTRICAL ENGINEERING</b>	<b>COURSE CODE:</b>		<b>EPM 212</b>
	<b>2-3-2021</b>	<b>60</b>	<b>3 HOUR</b>		<b>FRESH</b>

Answer the following:

Question (1) (15 marks)

- a) The current in a 0.7 F capacitance is shown in Fig.1.a. Sketch the wave form for the voltage  $v$  , the charge , the instantaneous power  $p$  and the energy stored  $w$  as function of time.
- b) A 60  $\Omega$  resistor is connected in series with a choking coil and capacitance. When the circuit is connected to 72 V, when the frequency is 300 Hz, the current is at maximum value 0.8 A and the potential difference across the capacitance is 200 V. Calculate:
- i) The value of the capacitance.
  - ii) The resistance and inductance of the coil.
  - iii) The total power losses in the circuit.

Question (2) (15 marks)

- a) For the circuit of Fig. 2.a. If  $i_1 = 3 e^{-4t}$  ,  $i_2 = 2 e^{-4t}$  ,  $V_3 = 5 e^{-4t}$  Find  $i_4$  .
- b) Find  $V_{ab}$  for the circuit shown in Fig. 2.b. by using
- i) Thevenin's Theorem.
  - ii) Norton's Theorem.

Question (3) (15 marks)

- a) Find  $R_t$  ,  $I_t$  and  $I_{ab}$  in the network shown in Fig. 3.a. By Star/Delta conversion.
- b) For the circuit shown in Fig. 3.b. Find the value of  $V_x$  by
- i) Superposition method.
  - ii) Nodal analysis.

Question(4) (15 marks)

- a)By using source conversion. Fins the value of  $V_{ab}$  for the circuit in Fig. 4.a.
- b)A 3- phase , 4- wire , 380 V , 50 Hz, ABC system supplies a star connected load in which  $Z_A = 10 \angle 30^\circ \Omega$  ,  $Z_B = 35 \angle 90^\circ \Omega$  ,  $Z_C = 40 \angle -45^\circ \Omega$  .  
Find the line current, the neutral current and the active , reactive and apparent power.

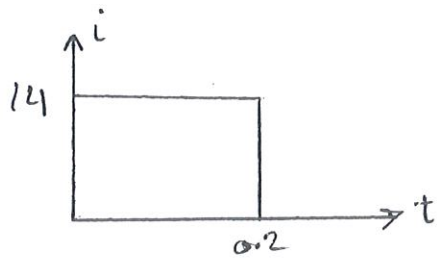


Fig. 1.a

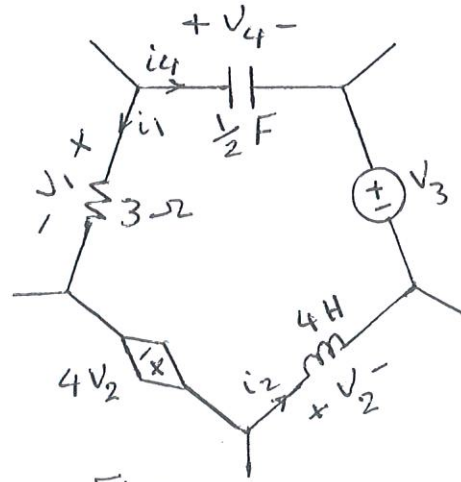


Fig. 2.a.

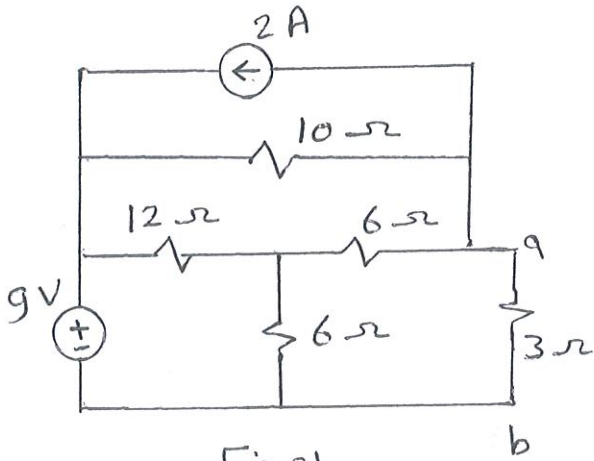


Fig. 2.b.

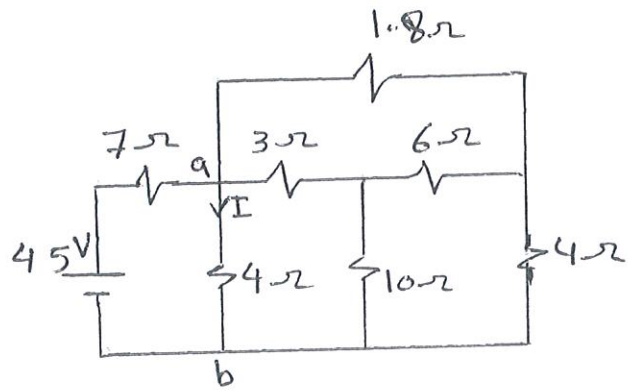


Fig. 3.a.

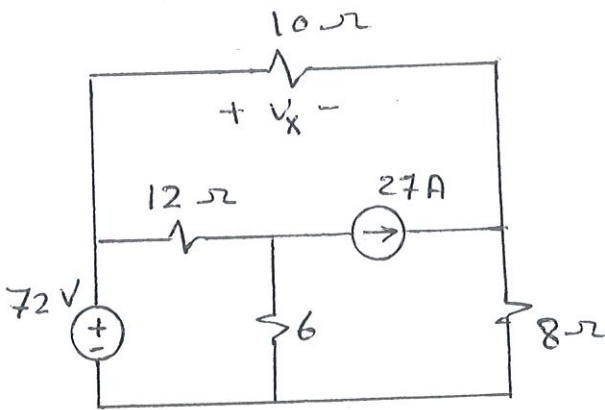


Fig. 3.b.

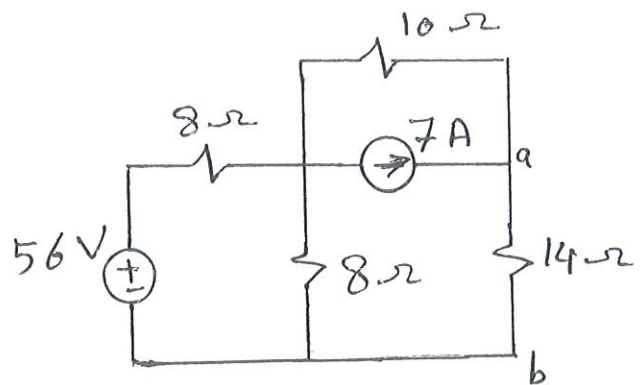


Fig. 4.a.



PORT SAID UNIVERSITY  
FACULTY OF ENGINEERING




DEPARTMENT OF PRODUCTION ENGINEERING AND MECHANICAL DESIGN

PROGRAM/ YEAR	PRODUCTION ENGINEERING & MECHANICAL DESIGN	SEMESTER	FIRST			
COURSE TITLE:	STRESS ANALYSIS	COURSE CODE:	PRD218			
DATE:	-1 - 2021	TOTAL ASSESSMENT MARKS:	100	TIME ALLOWED	3 HOUR	FRESH

Notice: Answer following questions:

- 1) A reinforced concrete column 50 cmx50 cm in section is reinforced with 4 steel bars of 2.5 cm diameter, one in each corner. The column is carrying a load of 200 ton. Find the stresses in the concrete and steel bars.  $E=2 \times 10^6 \text{ Kg/cm}^2$  for steel and  $0.14 \times 10^6 \text{ Kg/cm}^2$  for concrete. (a5-1)
- 2) A steel tube of 30mm external diameter and 20mm internal diameter encloses a copper rod of 15mm diameter to which it is rigidity joined at each rod. If, at a temperature of  $10^0\text{C}$  there is no longitudinal stress, calculate the stresses in the rod and tube when the temperature is raised to  $200^0\text{C}$ . Take E for steel and copper as  $2.1 \times 10^5 \text{ N/mm}^2$  and  $1 \times 10^5 \text{ N/mm}^2$ . The value of co-efficient of linear expansion for steel and copper is given as  $11 \times 10^{-6}$  per  $^0\text{C}$  and  $18 \times 10^{-6}$  per  $^0\text{C}$ . (b2-1)
- 3) A tension bar 5 m long is made up to of two parts, 3 m of its length has a cross-section of  $10 \text{ cm}^2$  while the remaining 2 m has a cross-section of  $20 \text{ cm}^2$ . A axial load of 80kN is gradually applied .Find the total strain energy produced in the bar and compare this value with that obtained in a uniform bar of the same length and the same material and the same volume under the same load. Take  $E= 2 \times 10^5 \text{ N/mm}^2$ . (b2-1)
- 4) A hollow shaft is to transmit 300kW power at 80 r.p.m. If the shear stress is not exceed  $60 \text{ N/mm}^2$  and the internal diameter is 0.6 of the external diameter, find the external diameter and internal diameter assuming that the maximum torque is 1.4 times the mean. (a5-1), (c1-3)
- 5) A thin cylinder having internal diameter 30cm and wall thickness 1cm is required to withstand an internal pressure of  $50 \text{ Kg/cm}^2$ . It is strengthened with a single layer of 0.2cm diameter wire closely wound over it. Find the initial stress in the wire if the stress in the cylinder is not to exceed  $500 \text{ Kg/cm}^2$ . Also find the final stress in the wire.  $E=2 \times 10^6 \text{ Kg/cm}^2$ . For cylinder  $E=1 \times 10^6 \text{ Kg/cm}^2$ . Poisson ratio =0.3. (a5-1)

6) A section of a mild steel, the maximum torque is 8437,5 Nm and maximum bending moment is 5062 Nm. The diameter of the shaft is 90mm .Determine the principal stresses and the Mohr circle. (b2-1)

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF Naval Arch. & Marine ENGINEERING					
	PROGRAM/ YEAR	NAVAL ARCH. & MARINE ENG. 2020 - 21	SEMESTER	FIRST		
	COURSE TITLE:	Naval Architecture (2)	COURSE CODE:	207		
DATE:	MARCH 6TH 2021	TOTAL ASSESSMENT MARKS:	60	TIME ALLOWED:	3 HOURS	FRESH EXAM.

**CLOSED BOOK EXAM.**

**Time: 3 HOURS**

\*\*\*\*\*

**NOTE: CALCULATIONS MUST BE INCLUDED & SKETCHES MUST BE NEAT.**

\*\*\*\*\*

**Answer is Required for ALL Questions**

1-a) Why ship end launching should be performed by aft-end? Hence.. Explain briefly two types of launching other than End Launching.

1-b) In ship end launching, use sketches to explain briefly the following:

i- Two hazards of end Launching,

ii- Define Ship checking and releasing arrangements.

6 points

2- A ship has 132 m L.B.P., and has a launching weight of 5,660 tons, its centre of gravity is located at 2.4 m aft of amiships. The fore poppet is 4.5 m from F.P., and the A.P. is located 21 m from AEGW.

The following end launching data are available:

Travel; m            60    75            90            105            120

Buoyancy; ton    630   1,328            2,445            3,860            5,640

Mt of Buoyancy @

AEGW; ton.m    ----   7,700            65,280            474,780            742,434

Draw the ship end launching diagram and then,

Determine the following requirements:

1. Travel when the stern lifts,

2. Load on the fore poppet when the stern lifts, then draw its distribution,

3. Minimum anti-tipping moment,

4. How much buoyancy force was remaining when the ship fore end drops into water, at  $b_i = d_i$ ?

20 points

PTO=>



(2) of two pages

3-a) Define and explain briefly the following:

1. Added mass, damped heave motion, and its equation of motion,
2. For a progressive wave in deep water define: profile and its equation, height, amplitude, length, period, wave number, frequency and velocity,

3-b) A progressive wave has different lengths of 5, 10, 15, 20, and 25 m.

Plot a curve of the wave celerity Vs. the wave period.

Also, a box shaped vessel has 120 m, 24 m, and 12 m, for its length, breadth, and draft; and has a KG = 7 m and has the following data:

Added mass coefficient in pitch = 0.40 ,  
" " " in heave = 0.80 .

Determine the following for un-damped motions:

1. Natural periods of pitch, and heave motions ONLY,
2. Critical wave speed, for pitch motion in head sea, where wave length to ship length ratio is 1.5.

20 points

4-a) How should the ship's rudder be deflected, to make a starboard turn?  
Why the maximum rudder angle is 35 deg.?

4-b) The normal force acting on a rudder plane at an angle  $\delta$ , is given by:

$$F_R = 577 A V_k^2 \sin \delta \quad \text{Newton}$$

Where,  $A$  is in  $m^2$ , and  $V_k$  is in m/s.

A ship has a single screw with single balanced rudder which has a trapezoidal profile with a vertical leading edge of 3.6 m in height, and the distance between ship's hull and rudder upper base at the axis is 40 cm. The upper large base is 1.8 m wide, and the lower small base is 1.2 m wide. The axis of the rudder stock is 0.36 m abaft the rudder leading edge. If the ship maximum speed is 15 knots, allow a 20% increase in the rudder flow velocity because of the propeller race effect.

Calculate the rudder stock diameter if the allowable stress of the rudder stock material is  $70 \text{ MN/m}^2$ .



Explain what changes must be done, if ship goes in astern direction??

14 points

---

GOOD LUCK!!

Prof. Dr. Mo'men Gaafary

	<b>Port-Said University</b> <b>Faculty of Engineering</b>				
	<b>Mechanical Power Engineering Department</b>				
Program	2 <sup>nd</sup> Year Mech. Power Eng. Dept.	Semester:	First		
Course title:	Fluid Dynamics	Course code:	MEP210		
Date:	Jan. 2021	Total assessment marks:	60	Time allowed:	3 hours
					Fresh

- *Use of friction charts are allowed (two charts)*

ملحوظة هامة: لا ينظر للمسألة التي لها أكثر من حل.

**Carefully answer the following questions:**

**Question No. 1 : (16 Marks: 3,3,5,5)** [ILOs a1-1, a1-2, a5-1, b2-1, b4-1 and c1-1]

**a)** Define: EFD, AFD, and CFD

**b)** In fully developed straight-duct flow, the velocity profiles do not change (why), but the pressure drops along the pipe axis.

**c)** It is observed that the velocity 'V' of a liquid leaving a nozzle depends upon the pressure drop 'P' and the density 'ρ'. Show the relationship between them.

**d)** Water ( $\rho = 998 \text{ kg/m}^3$  and  $\nu = 1.004 \times 10^{-6} \text{ m}^2/\text{s}$ ) flows in a 0.15-m-smooth diameter pipe with a flow rate of  $0.057 \text{ m}^3/\text{s}$ . What is the velocity at a distance 0.01 m away from the wall? Determine the centerline velocity.

**Question No. 2 : (16 Marks: 3,5,8)** [ILOs a1-1, a1-2, a5-1, a12-2, b2-1, b4-1 and c1-1]

**a)** Define: Water hammer, streamlined and blunt bodies

**b)** A viscous, incompressible fluid flows between a fixed two infinite, vertical, parallel plates of Fig. (1). Determine, by use of the Navier–Stokes equations, an expression for the pressure gradient in the direction of flow. Express your answer in terms of the mean velocity. Assume that the flow is laminar, steady, and uniform.

**c)** Suppose you build a house out in the ‘boonies,’ where you need to run a pipe to the nearest water supply ( $\nu = 1.005 \times 10^{-6} \text{ m}^2/\text{s}$ ), which is about 1 km above the elevation of your house Fig. (2). The gage pressure at the water supply is 1 MPa. You require a minimum of 3 gal/min ( $1.89 \times 10^{-4} \text{ m}^3/\text{s}$ ) when your end of the pipe is open to the atmosphere. To minimize cost, you want to buy the smallest possible diameter pipe with a smooth surface. (a) Find the total head loss from pipe inlet to exit, neglecting minor losses.

(b) Which is more important to this problem, the head loss due to elevation difference, or the head loss due to pressure drop in the pipe? (c) Find the minimum required pipe diameter

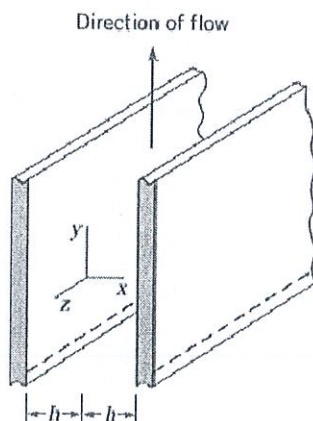


Fig. 1

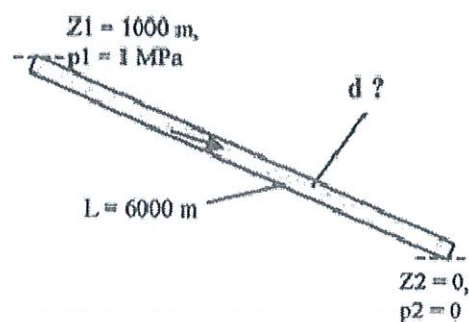


Fig. 2

**Question No. 3 :** (16 Marks: 3,3,6,4) [ILOs a1-1, a1-2, a5-1, b2-1, b4-1 and c1-1]

**a)** What is the importance of the dimples on the surface of a golf ball?

**b)** Two pipes of identical length and friction factor connected in parallel. The diameter of one of the pipes is twice the diameter of the other. Determine: the ratio of the flow rates in the two pipes.

**c)** A helicopter (Fig. 3) during a test has its four main blades turning at 100 r/min with the blades oriented parallel to the plane of rotation. Each blade is 3.5 m long. The average width is 200 mm. The transition in the boundary layer is at a Reynolds number of  $10^6$  and for air ( $\rho = 1.21 \text{ kg/m}^3$  &  $\nu = 1.7 \times 10^{-5} \text{ m}^2/\text{s}$ ). What power is needed to maintain this rotation of the four blades? Consider only skin drag.

**d)** An automobile has a coefficient of drag of 0.36 and a frontal area  $A$ . A remodeling of the sheet metal reduces  $C_D$  to 0.3 and the frontal area of  $0.9 A$ . If the older model gets (gas consumption) 10 km/L at 85 km/h, what should the newer model get at the same speed? The drive system has not been changed.

**Question No. 4 :** (12 Marks: 3,3,6) [ILOs a1-1, a1-2, a5-1, b2-1, b4-1 and c1-1]

**a)** Potential flow theory is not valid near the wall flow. (Discuss)

**b)** Define, with the help of a neat sketch, the boundary-layer thickness and momentum thickness.

**c)** Consider a steady, two-dimensional, incompressible velocity field with  $u = ax + b$  and  $v = -ay + cx$ , where  $a$ ,  $b$ , and  $c$  are constants:  $a = 0.50$ ,  $b = 1.5$ , and  $c = 0.35$ .

Generate an expression for the stream function and plot some streamlines of the flow in the  $x$  and  $y$  ( $0 : 5$ ).

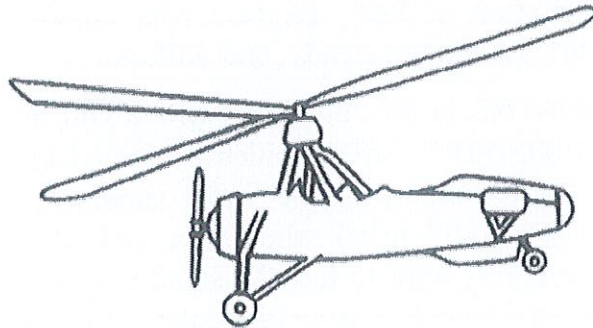




Fig. 3

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>CIVIL ENGINEERING DEPARTMENT</b>				
	PROGRAM/ YEAR	(CIVIL Engineering) 2020-2021	SEMESTER	First	
COURSE TITLE:	Irrigation and Drainage Engineering	COURSE CODE: CIV213	2 <sup>nd</sup> Year		
DATE:	11-3-2021	TOTAL ASSESSMENT MARKS:	45	TIME ALLOWED:	3:00 HOURS
					FRESH

- Answer all the questions.
- Net sketch drawings are required

(١٢ درجة)

السؤال الأول:

١. اكتب عن الأتي مع التوضيح بالرسم كلما أمكن:

- الصور المختلفة للمياه في التربة – معامل الذبول – السعة الحقلية
- العوامل المؤثرة على الإستهلاك المائي للنبات
- كفاءة شبكة الري – كفاءة الري الحقلية
- أجهزة قياس ملوحة التربة – الطرق المختلفة لغسيل التربة

٢. احسب عمق مياه الري اللازم لإعادة نفس نسبة الرطوبة في التربة حيث أخذت عينة غير مقلقلة بقطر ١٥ سم وارتفاع ٣٠ سم علما بأن وزن العينة قبل التجفيف = ٥٧٨٠ جم وبعد التجفيف كانت ٥٢٨٠ جم.

٣. حدد الفترة بين الريات لنبات القطن مزروع في تربة طينية ذات كثافة ١,٢٥ جم/سم<sup>3</sup> والسعة الحقلية = ٣٥٪ والمياه الذرية = ١٢٪ إذا علمت أن متوسط النسبة المئوية لعدد ساعات النهار المضيئة هي ٢٠ ومتوسط درجات الحرارة في أشهر نموه هي ١٩ درجة مئوية ومعامل بلاني كريدل = ٠,٦٠.

(١٣ درجة)

السؤال الثاني:

١. اكتب عن الأتي مع التوضيح بالرسم كلما أمكن:

- العوامل الحاكمة لإختيار طريقة الري
- مميزات وعيوب الري بالرش

٢. قطعة أرض أبعادها (١٦٤٠ متر x ١٢٠٠ متر) يراد زراعتها بالأشجار وريها بالتنقيط من ترعة تمر بالاتجاه الطولي مع العلم بأن الأشجار مزروعة على رؤوس مربعات طول ضلع كل منها ٥ متر واحتياج الشجرة = ٨٠ لتر/يوم وتصرف المنقط = ٢ لتر/ ساعة والضغط الواقع على المنقط = ١ ض.ج. ومعامل احتكاك المواسير = ٠,٠٠٥ وعدد ساعات تشغيل الطلمبة اليومي = ١٠ ساعات مع إعتبار الكفاءة = ٨٥٪.

المطلوب:

- تخطيط عام لقطعة الأرض مع بيان تفصيلا لإحدى الشرائح
- تصميم شبكة المواسير وكذلك محطة الطلمبات وحساب قدرة الموتور

Please turn over

السؤال الثالث:

(١٢ درجة)

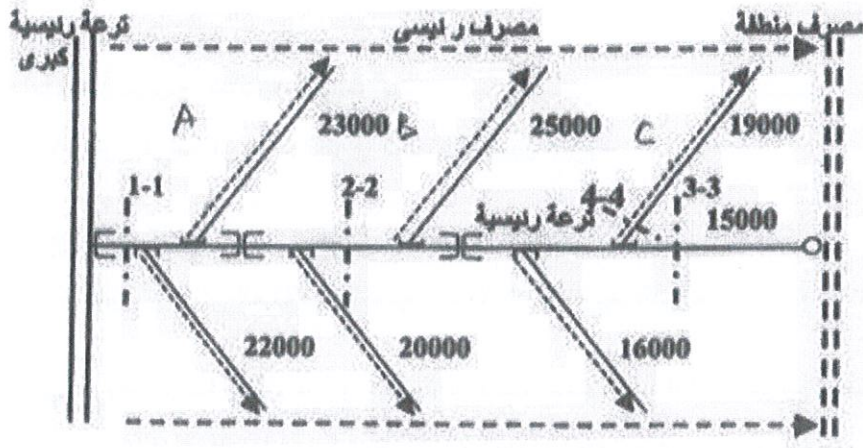
١. اشرح بالتفصيل الخطوات اللازمة لعملية تخطيط شبكة الترغ والمصارف

٢. ما هي خطوات رسم الدياگرام المائي للترغ والمصارف

٣. التخطيط الموضح بالشكل لقطعة أرض منزرة كالتالي: ٤٠٪ برسيم، ٣٥٪ قطن، ٢٠٪ شراقي معدة لزراعة

الذرة، ٥٪ منافع والترعة الرئيسية يتفرع منها ٦ ترع زماماتها كما هو موضح بالرسم والمطلوب الآتي:

- إرسم دياگرام المناوبة مع حساب مقنن الحقل والترعة الرئيسية والفرعية
- تصميم القطاع 1-1 على الترعة الرئيسية علما بأن نسبة التعويض ٢٠٪ والميول الجانبية 3:2
- إحسب كميات الحفر والردم للقطاع 1-1 علما بأن عرض الطريق = ٧ متر وسمكه = ١,٥ متر
- إرسم القطاع بمقياس رسم مناسب موضحا عليه حدود نزع الملكية



السؤال الرابع:

(٨ درجات)

١. اكتب عن الآتي مع التوضيح بالرسم كلما أمكن:

• منشآت التنظيم والإدارة - منشآت تصريف الماء الزائد

• التبطين باستخدام بلاطات خرسانية سابقة الصب - التبطين بالأغشية - التبطين بالجايونات

٢. منطقة يراد تنفيذ شبكة صرف مغطى لها إذا علم الآتي: مقنن الصرف = ٢,٠٠ م/يوم - أقل عمق لازم

للصرف ١,٠٠ متر من سطح الأرض - متوسط معامل التوصيل الهيدروليكي ٠,١٤ م/يوم - عمق المصرف

من أرض الزراعة ٢,٥٠ متر - قطر مواسير الصرف ٢٠ سم وسمك الطبقة المنفذه ٨,٠٠ متر من سطح

الأرض

i. إحسب المسافة بين المصارف الحقلية



ii. بين بالرسم فقط كيفية دخول وخروج المياه إلى المصارف المغطاه - إتصال المصارف المغطاه

بالمجمعات والبيارات)

iii. مميزات وعيوب الصرف المغطى

مع تمنياتي بالنجاح والتوفيق

د.م. محمد الطرابيلي

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF PRODUCTION ENGINEERING AND MECHANICAL DESIGN</b>				
	PROGRAM/ YEAR	2 <sup>nd</sup> YEAR PRODUCTION ENGINEERING 2020 - 2021	SEMESTER	FIRST	
COURSE TITLE:	Materials Cutting Processes	COURSE CODE:	PRD21 <sup>v</sup>		
DATE:	11-3-2021	TOTAL ASSESSMENT MARKS:	90	TIME ALLOWED:	3 HOURS

**Assume reasonable value for any missing data**

الوحدات مهمة جدا والخطأ فيها أو عدم كتابتها له تأثير سلبي على الدرجات مع مراعاة تنظيم الإجابة واجابة كل سؤال في صفحة

**Question (1) [30 marks]**

**A. Complete the following comparison [15 marks]**

	1. <u>EDM</u>	2. <u>ECM</u>	3. <u>USM</u>
Abbreviation definition			
Energy type			
MRR principle			
Machining medium			
Mechanism simple sketch			

**B. Various operations done on lathe such as taper and cutting thread: [8 marks]**

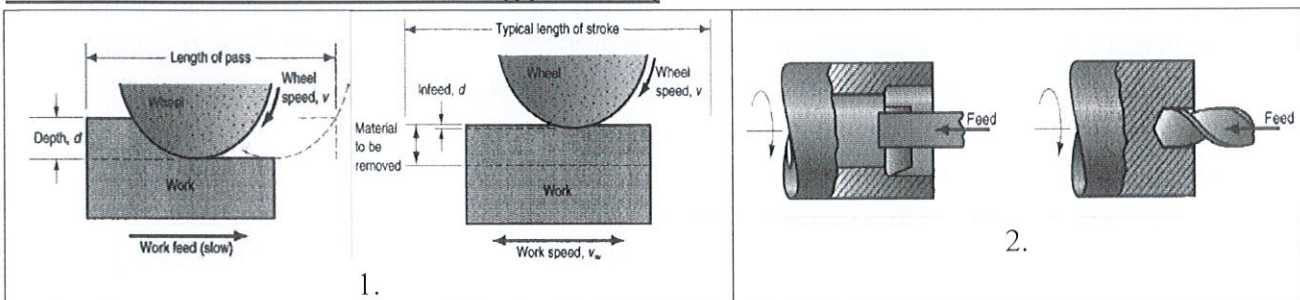
- 1) What are the different methods of taper turning?
- 2) Calculate the tailstock offset required to turn a 1:30 taper x 60 mm long on a workpiece of 300 mm long. The small diameter of the tapered section is 20 mm.
- 3) Calculate the *tpf* for a taper with the following dimensions: large diameter =  $1\frac{3}{8}$  ", small diameter =  $1\frac{5}{16}$  ", length of tapered section = 7".
- 4) Calculate the pitch of thread if the pitch of lead screw of the lathe is 5mm, the number of teeth of change gears is: First step: a=30 and b=80 teeth, Second step: c=30 and d=90 teeth.

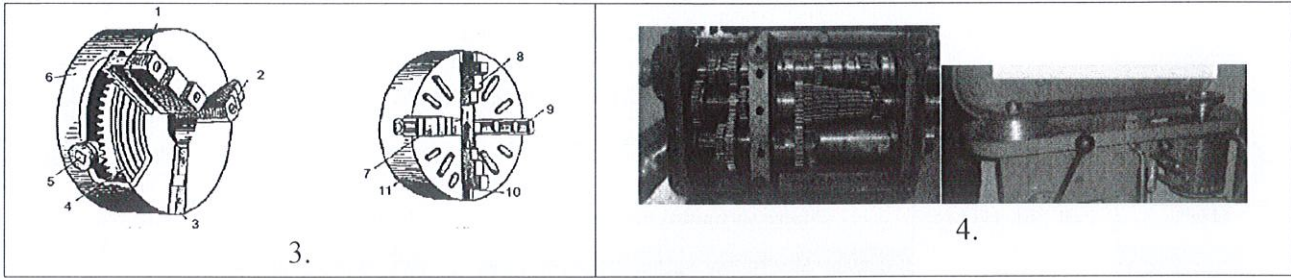
**C. What are the differences between milling and grinding process? [2 marks]**

**D.** In a surface grinding operation performed on hardened plain carbon steel, the grinding wheel has a diameter = 200 mm and width = 25 mm. The wheel rotates at 2400 rev/min, with a depth of cut (infeed)= 0.05 mm/pass and a crossfeed = 3.50 mm. The reciprocating speed of the work is 6 m/min, and the operation is performed dry. Determine (a) length of contact between the wheel and the work and (b) volume rate of metal removed. (c) If there are 64 active grits/cm<sup>2</sup> of wheel surface, estimate the number of chips formed per unit time. (d) What is the average volume per chip? (e) If the tangential cutting force on the work = 25 N, compute the specific energy in this operation? [5 marks]

**Question (2): [20 marks]**

**A. Differentiate between the following [4 marks]**





**B.** What is CHM? State the main steps of CHM with drawing. [4 marks]

**C. Grinding** is a material removal process accomplished by abrasive particles. Based on your study:

- 1) Illustrate with drawing the three mechanisms of grinding wheel wear? [3 marks]
- 2) Define with drawing the wheel structure, and what are its proportions and grades? [3 marks]
- 3) Define the grinding wheel specification: 30 A 46 H 6 V. [3 marks]

**D.** Determine the time required to drill a blind hole of diameter 25 mm and depth 40 mm in a mild steel solid block by a HSS drill of  $118^\circ$  cone angle. Assume  $V_c = 44$  m/min,  $s_o = 0.25$  mm/rev, and  $A = O = 2$  mm. [3 marks]

**Question (3): [20 marks]**

- A. Bring out the difference between up and down milling. [8marks]
- B. Give complete information about the gear changes of the following gear index method, it is required to mill six right-hand helical flutes with a lead of 600 mm; the blank diameter is 90 mm. If the pitches of the table lead screw is 7.5 mm. [6marks]
- C. Select the differential change gears and the index plate (Brown and Sharpe), and determine the number of revolutions of the index crank for cutting a spur of  $Z = 293$  teeth. [6marks]

**If Brown and Sharpe**

Plate 1: 15, 16, 17, 18, 19, and 20

Plate 2: 21, 23, 27, 29, 31, and 33

Plate 3: 35, 37, 39, 41, 43, 47, and 49

**No of gear teeth:** 24-24-28-32-36-40-44-48-56-64-72- 86- 100



**Question (4): [20 marks]**

- A. A machinability rating is to be determined for a new work material using the cutting speed for a 60 min tool life as the basis of comparison. For the base material (B1112 steel), test data resulted in Taylor equation parameter values of  $n = 0.29$  and  $C = 500$ , where speed is in m/min and tool life is min. For the new material, the parameter values were  $n = 0.21$  and  $C = 400$ . These results were obtained using cemented carbide tooling.
  - (a) Compute a machinability rating for the new material.
  - (b) Suppose the machinability criterion were the cutting speed for a 10 min tool life rather than the present criterion. Compute the machinability rating for this case. [10 marks]
- B. A HSS tool is used to turn a steel work part that is 300 mm long and 80 mm in diameter. The parameters in the Taylor equation are:  $n = 0.13$  and  $C = 75$  (m/min) and feed 0.4 mm/rev. The operator and machine tool rate = \$30/hr., and the tooling cost per cutting edge = \$4 , It takes 2 min to load and unload the work part and 3.5 min to change tools.

**Determine:** (a) Cutting speed for maximum production rate,

(b) Tool life in min of cutting, and

(c) Cycle time and cost per unit of product. [10 marks]

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF MECHANICAL POWER ENGINEERING				
	Program/ Year	(PRODUCTION ENGINEERING)	Semester	First	
COURSE TITLE:	HEAT TRANSFER AND HEAT EXCHANGERS	COURSE CODE:	MPE 217		
DATE:	28/2/ 2021	TOTAL ASSESSMENT MARKS:	60	TIME ALLOWED:	3 HOURS
					FRESH

*Using tables and charts is allowed*

**Question No. 1 (12 Marks)**

- a) Write an equation for each of the following:
- i. Fourier's law of heat conduction
  - ii. Steady- state two-dimensional heat flow in cartesian coordinates with internal heat generation.
  - iii. One -dimensional, steady state heat conduction in cylindrical coordinates without internal heat generation.
  - iv. The thermal resistance of convection. [4 Marks]
- b) Define the following: Black body, Stefan-Boltzmann Law, Absorptivity. [3 Marks]
- c) The **inner surface** of a 0.25 m brick wall of a furnace ( $k = 0.85 \text{ W/m.K}$ ) is at  $825^\circ\text{C}$ . An insulating wall 0.25 m thick and of a thermal conductivity equals to  $0.25 \text{ W/m.K}$  is added to the furnace wall. Assume that the surroundings are at  $21^\circ\text{C}$  and that the heat transfer coefficient at the surface of the outer wall is  $11.8 \text{ W/m}^2 \text{ K}$ . **Calculate:**
- i. the heat loss per unit area and
  - ii. the brick interface and outer surface temperatures [5 Marks]

**Question No. 2 (12 Marks)**

- a) Define the critical radius of insulation ( $r_c$ ). And then, derive an expression for the critical radius of insulation surrounding a tube. [4 Marks]
- b) Calculate the critical radius of insulation for asbestos [ $k = 0.17 \text{ W/m.}^\circ\text{C}$ ] surrounding a pipe and exposed to room air at  $20^\circ\text{C}$  with  $h = 3 \text{ W/m}^2.^\circ\text{C}$ . Also, calculate the heat loss per unit length from the  $200^\circ\text{C}$ , 5-cm-diameter pipe when covered with the critical radius of insulation and also without insulation. [5 Marks]
- c) A 8-cm-diameter sphere is heated to a temperature of  $200^\circ\text{C}$  and is enclosed in a large room at  $20^\circ\text{C}$ . Determine the rate of heat transfer by radiation if the surface emissivity is 0.6. [3 Marks]



**Question No. 3 (12 Marks)**

- a) **State the following:** sources of heat generation- Biot number. [3 Marks]
- b) **Derive** an expression for the temperature distribution, in a plane wall with uniformly **heat generation** ( $q_g$ ). The wall is made of metal and has a thermal conductivity ( $k$ ) and a thickness of ( $2L$ ). The temperature at both edges is maintained at  $T_w$ . [4 Marks]
- c) A cylinder of 12 cm diameter has a heat generation rate  $10^6$  W/m<sup>3</sup>. The conductivity of the material is 200 W/m. K. The surface is exposed to air at 30°C. The convection coefficient is 500 W/m<sup>2</sup>. K. **Determine** the temperatures at the center **and** also at mid radius. [5 Marks]

**Question No. 4 (12 Marks)**

- a) **Define:** Reynolds number – Nusselt number – Fin effectiveness – Turbulent flow. [5 Marks]
- b) A horizontal pipe 8 cm in diameter is located in a room where atmospheric air is at 25°C. The surface temperature of the pipe is 129°C. **Determine** the convection heat loss per meter of the pipe. [7 Marks]

**Question No. 5 (12 Marks)**

- a) **What** is meant by a lumped heat capacity system ? [2 Marks]
- b) **Derive** an expression of temperature dependent of a body as a function of time and the heat-transfer coefficient of the fluid. Assume that the temperatures of the body and fluid are uniform at any instant so that the lumped-capacity method of analysis can be used. [4 Marks]
- c) A plane wall has 20 cm thick and (1x3 m<sup>2</sup>) as dimensions made of stainless steel ( $k= 19$  W/m.°C,  $\rho= 7933$  kg/m<sup>3</sup>,  $c= 460$  J/kg.K,  $\alpha= 0.526 \times 10^{-5}$  m<sup>2</sup>/s) at initial temperature of 320°C is exposed to water at temperature of 50°C. The heat transfer coefficient by convection at the plate surface is 500 W/m<sup>2</sup>.°C. **Find** the time required to reduce the temperature at a distance of 3 cm apart from the plate edge to become 110°C and **calculate** the heat lost from the plate at this time. [6 Marks]

Best Wishes

Assoc. Prof. Dr. Mohamed M. Shabaan

Dr Moustafa Shehata

Department : Prod. Eng.& Mechanical Design  
 Year : 2<sup>nd</sup> Year (PRD223)  
 Exam : Final exam  
 Subject : Design of Machine Elements (I)

Date / التاريخ : 2021  
 Time / المدة : ثلاث ساعات

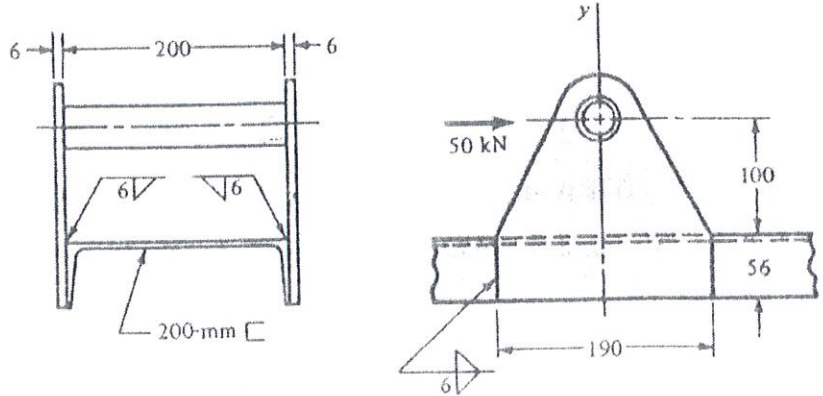
القسم : هندسة الإنتاج والتصميم الميكانيكي  
 الفرقة : الثانية - (ميكانيكا قوى)  
 امتحان : نهائي ( الفصل الدراسي الاول)  
 المادة : تصميم عناصر الماكينات

**Problem (1) (14 Marks) (A3C13)**

- (A) A solid circular shaft is subjected to a bending moment of 3000N-m and a torque of 10000N-m. The shaft is made of steel having ultimate tensile stress of 700MPa and an ultimate shear stress of 500MPa. Assuming a factor of safety as 6, determine the diameter of the shaft. (9 Marks)
- (B) A shaft of 50mm diameter transmits a torque of 2000Nm to a gear mounted to it by a feather key. The contact length between the key and shaft is 75mm. The material of the key is medium carbon steel with  $\sigma_y = 350\text{MPa}$ . Determine the size of the key (b and h) necessary to give a safety factor of at least 2 against failure stresses. (5 Marks)

**Problem (2) (16 Marks) (A8D1)**

A 50kN load is transferred from a welded fitting into a 200mm steel channel as illustrated in the figure. Calculate the maximum stress in the weld. Consider the area properties are the following:



$A = 1280\text{mm}^2$ ,  $\bar{X} = 10.4\text{mm}$ ,  $\bar{Y} = 95\text{mm}$   
 $J_u = 1667 \times 10^3\text{mm}^3$ ,  $I_u = 52 \times 10^3\text{mm}^3$ .

**Problem (3) (16marks) (A3C13)**

A cylinder head of a pressure vessel is fastened to the cylinder cover using 6 bolts. Each bolt is subjected to initial tightening of  $F_c = 30\text{KN}$ . The internal diameter of the vessel is 300mm and the internal pressure is 15bar. The stiffness of the bolt  $C_s = 200\text{KN/mm}$  and of the tight parts  $C_p = 400\text{KN/mm}$ . The allowable tensile stress of the bolt material is 150MPa.

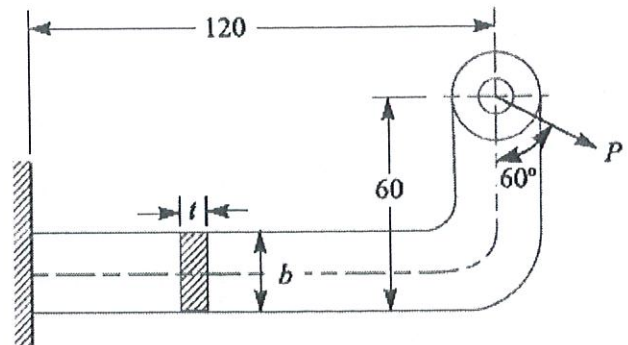
- a- Draw the force-deformation diagram for the screw joint to scale in full page showing all forces and deformations of the joint. (6.0 Marks)
- b- Calculate the diameter of the using bolts. (6.0 Marks)
- c- Calculate the leakage pressure. (4.0 Marks)

**Problem (4) (12marks) (A8D1)**



A cast iron cylinder of internal diameter 200mm and thickness 50mm is subjected to a pressure of  $5\text{N/mm}^2$ . Calculate the tangential and radial stresses at the inner, middle and outer surfaces. Indicate with drawing; the stress distribution on the cylinder wall.

**Problem (5) (12marks) (A3C13)**

A wall bracket, as shown in figure, is subjected to a pull of  $P = 5\text{kN}$ , at  $60^\circ$  to the vertical. The cross-section of bracket is rectangular having  $b = 3t$ . Determine the dimensions of (b) and (t) if the stress in the material of the bracket is limited to 28MPa.



All dimensions in mm.

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF MECHANICAL POWER ENGINEERING</b>					
	PROGRAM/ YEAR	(MECHANICAL POWER ) 2020-21	SEMESTER	SECOND		
COURSE TITLE:	<b>Heat Transfer (ثانية قوى)</b>	COURSE CODE:	MEP 215			
<b>DATE:</b>	<b>12-6-2021</b>	<b>TOTAL ASSESSMENT MARKS:</b>	<b>75</b>	<b>TIME ALLOWED:</b>	<b>3 HOURS</b>	<b>FRESH</b>

### Solve all the Five Questions

1.1 Drive the differential equation for one-dimensional heat conduction through cylindrical wall

(A1.1, A1.2, C5.1) (5 Mark)

1.2 A plane wall of thickness 1 m and thermal conductivity 0.5 W/m .K. Heat is generated within the wall at a rate per unit volume given by  $\phi = \Gamma e^{-\gamma x}$  where  $\Gamma = 10 \text{ W/m}^3$  and  $\gamma = 0.1 \text{ m}^{-1}$ . The wall is insulated on one side, while the other side is maintained at a fixed temperature of 20°C. Determine the maximum temperature in the wall.

(A1.1, A1.3, C5.1) (10 Marks)

2.1 Drive the differential equation for long fin with uniform cross-sectional area.

(A1.1, A1.2, C5.1) (5 Mark)

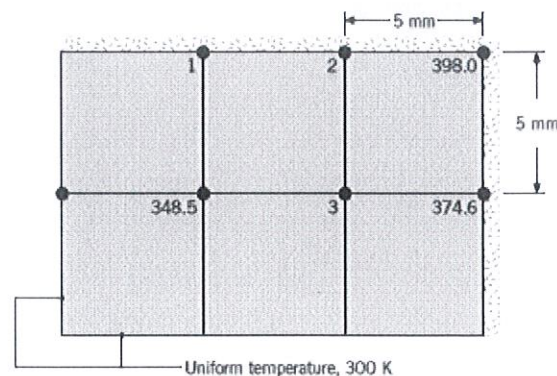
2.2 A certain internal-combustion engine is air-cooled and has a cylinder constructed of cast iron [ $k = 35 \text{ Btu/h.ft.}^\circ\text{F}$ ].

The circular fins on the cylinder have a length of  $\frac{5}{8}$  in and thickness of  $\frac{1}{8}$  in. The convection coefficient is 12 Btu/h.ft<sup>2</sup>.°F. The cylinder diameter is 4 in. Calculate the heat loss per fin for a base temperature of 450°F and environment temperature of 100°F.

(A1.1, A1.3, A3.1, C5.1) (10 Marks)

3. Steady-state temperatures (K) at three nodal points of a long rectangular rod are as shown ( $\Delta x = \Delta y = 5 \text{ mm}$ ).

The rod experiences a uniform volumetric generation rate of  $5 \times 10^7 \text{ W/m}^3$  and has a thermal conductivity of 20 W/m .K. Two of its sides are maintained at a constant temperature of 300 K, while the others are insulated.



a) Determine the temperatures at nodes 1, 2, and 3.

(6 Marks)

b) Calculate the heat transfer rate per unit length (W/m) from the rod using the nodal temperatures.

(2 Marks)

c) Compare this result with the heat rate calculated from knowledge of the volumetric generation rate and the rod dimensions.

(2 Marks)

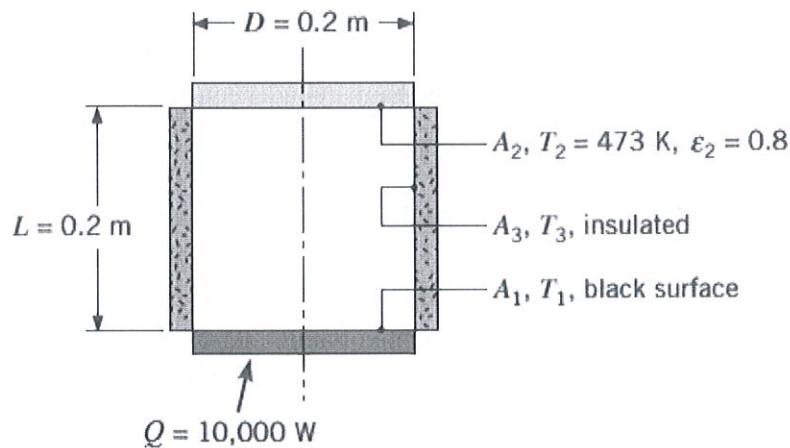
(A1.1, A1.3, A3.1, C3.1, C5.1)

4.1 Drive the differential equation for transient heat transfer with negligible internal resistance. (A1.1, A1.2, C5.1) (5 Marks)

4.2 A long rod 40 mm in diameter, fabricated from aluminum oxide ( $\rho = 3970 \text{ kg/m}^3$ ,  $C = 1068 \text{ J/kg.K}$ ,  $k = 22.3 \text{ W/m.K}$ ,  $\alpha = 5.259 \times 10^{-6} \text{ m}^2/\text{s}$ ) and initially at a uniform temperature of 800 K, is suddenly cooled by a fluid at 300 K having a heat transfer coefficient of 1600  $\text{W/m}^2.\text{K}$ . After 35 s, the rod is wrapped in insulation and experiences no heat losses. What will be the temperature of the rod after a long period of time? (A1.1, A1.3, A3.1, C5.1) (10 Marks)

5.1 Drive the equations of radiation surface and space resistances. (A1.1, A1.2, B1.1, C1.1) (5 Mark)

5.2 Consider the three-surface enclosure shown. The lower plate ( $A_1$ ) is a black disk of 200-mm diameter and is supplied with a heat rate of 10000 W. The upper plate ( $A_2$ ), a disk coaxial to  $A_1$ , is a gray surface with  $\epsilon_2 = 0.8$  and is maintained at  $T_2 = 473 \text{ K}$ . The gray sides between the plates are perfectly insulated. Assume convection heat transfer is negligible. Determine the operating temperature of the lower plate  $T_1$  and the temperature of the insulated side  $T_3$ .



(A1.1, A1.3, A3.1, B1.1, C1.1) (15 Marks)

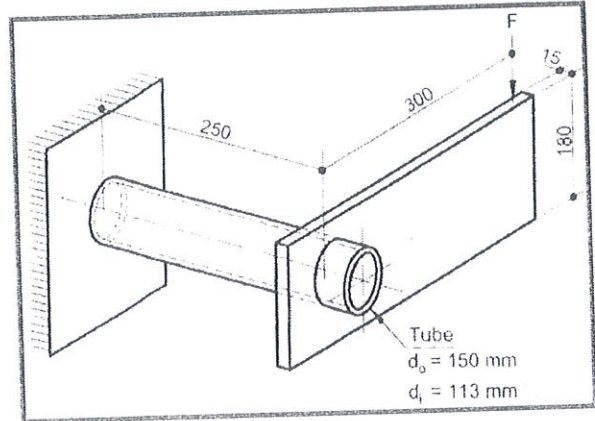
- يسمح للطلاب باستخدام خرائط وجداول ومعدلات التصميم الخاصة بالمادة
- الوحدات مهمة جدا والخطأ فيها أو عدم كتابتها له تأثير سلبي على الدرجات
- إجابة كل سؤال وكل سؤال فرعى يكون في صفحة جديدة مع كتابة رقم السؤال
- افرض قيم مناسبة لأي بيانات ناقصة
- الأبعاد الموجودة على الرسم بالمم
- النهاية العظمى للدرجات 90 درجة

Answer the following questions:

**Question 1: 18 Marks**

The bracket shown in the figure is made of St-50 ( $\sigma_u=500$ ,  $\sigma_y=300$ ,  $\sigma_e=200$  MPa) and it is subjected to a static load  $F=50$  KN.

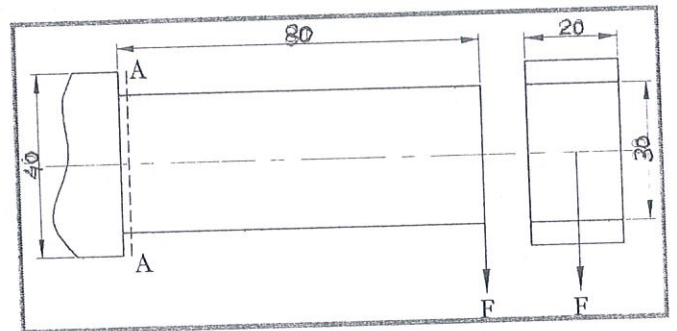
Find the factor of safety  $S$  of the bracket.



**Question 2: 18 Marks**

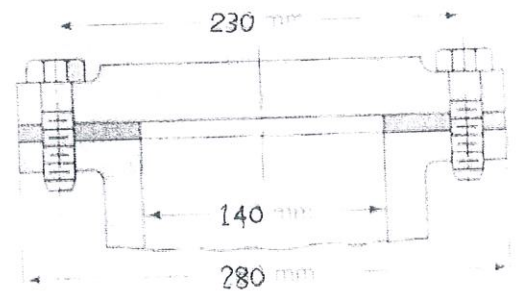
The machine member in the figure is subjected to fluctuating bending due to the force  $F$  which is fluctuated between  $F_{max}=4$  KN and  $F_{min}=1$  KN. The member is made of St.42 having the strength properties of :  $\sigma_y=250$ ,  $\sigma_e=190$  MPa.

Estimate the factor of safety ( $S$ ) for the given machine member at section A-A.



**Question 3: 18 Marks**

A cylindrical pressure vessel is designed to withstand static internal pressure ( $P$ ) and it is fastened to its cover by 6 bolts M18 as shown in the figure. The stiffness of the bolt  $C_s=300$  KN/mm and of the tight parts  $C_p=100$  KN/mm. The tightening force for each bolt is 25 KN. The material class of the bolts is 8.8 ( $\sigma_y=640$ ,  $\sigma_e=200$  MPa). The factor of safety of the bolts is 2.

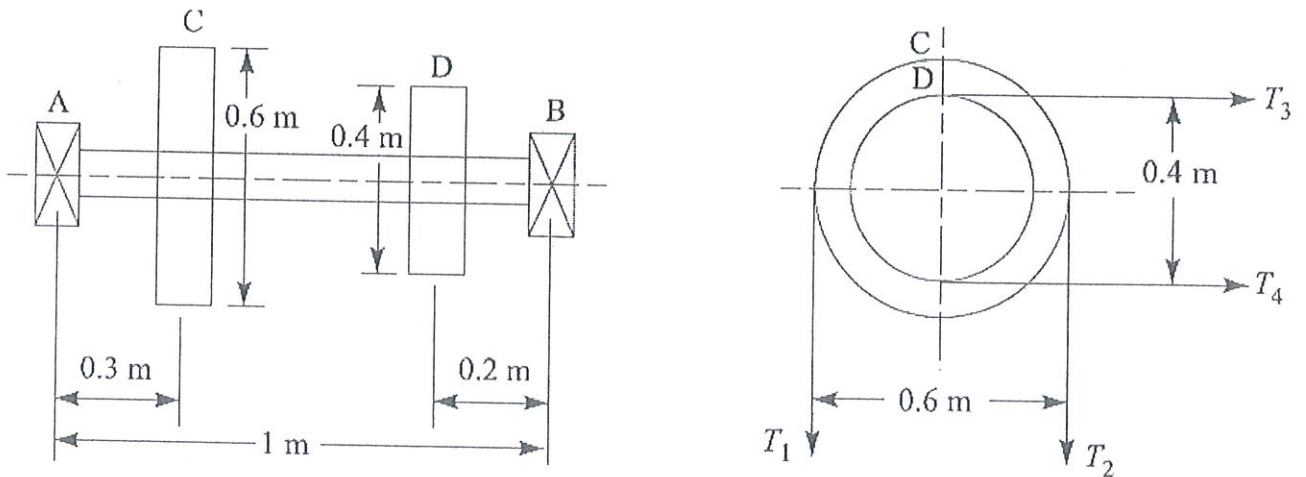


- Calculate the internal pressure ( $P$ ) inside the cylinder.
- Draw the force deformation diagram to scale for the connection showing the details of all forces and deformations

**Question 4: 25 Marks**

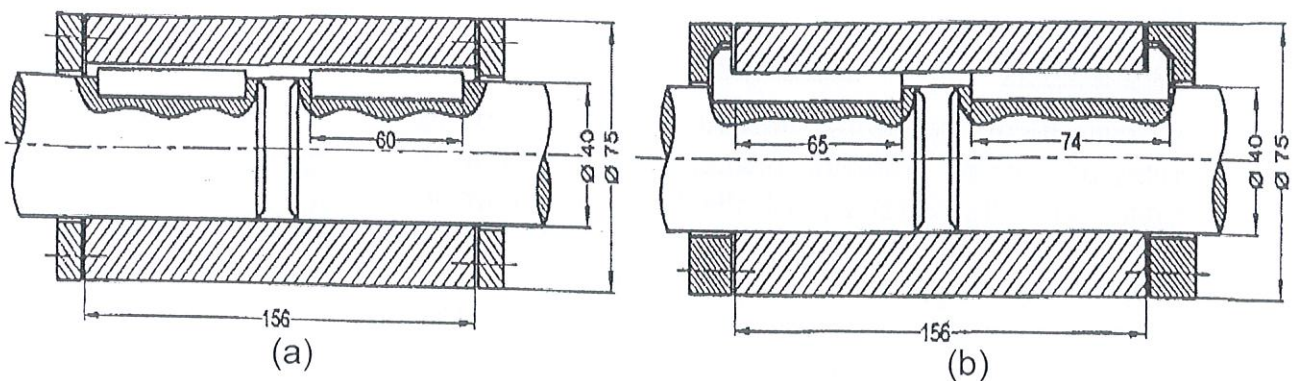
A solid shaft shown in the figure is supported on two bearings A and B and carries two pulleys C and D. The maximum tension of the belt at pulley C is  $T_1 = 2250$  N. The angle of contact for both pulleys is  $180^\circ$  and  $\mu = 0.24$ . Assume that the torque on pulley A is equal to that on the pulley B. The allowable working stress of shaft material is 63 MPa in tension and 42 MPa in shear.



Determine the suitable diameter for the shaft.



**Question 5: 20 Marks**

Figures a and b show two different types of muff coupling. Calculate the torque which can be transmitted by each coupling if the allowable surface pressure of the coupling/key material  $P_{sall} = 80$  MPa and the allowable shear stress of the key material  $\tau_{all} = 40$  MPa. The cross sectional area of all keys  $b \cdot h = 12 \cdot 8$  mm. Take  $\mu = 0.1$ ,  $C_t = 1.3$ .



	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF MECHANICAL POWER ENGINEERING</b>					
	PROGRAM/ YEAR	<b>CHEMICAL ENGINEERING</b> <b>SECOND YEAR</b>	SECOND TERM	SECOND		
	COURSE TITLE:	<b>Heat Transfer &amp; Applications</b>	COURSE CODE	MEP 220		
<b>DATE:</b>	<b>12-6-2021</b>	<b>TOTAL MARKS</b>	<b>75</b>	<b>TIME ALLOWED:</b>	<b>3 HOURS</b>	<b>FRESH</b>

**Tables and charts are allowable. Assume any missing data.**

**Question No. One:** (A1.1, A1.2, A1.3, B1.3)

**1.a Drive** an expression of the overall heat transfer coefficient for a conduction – convection cylindrical system. .... (5 Marks)

**1.b** A pipe has ID and OD of 20 and 24 cm [ $k = 20 \text{ W/m } ^\circ\text{C}$ ]. Inner surface temperature is  $230 \text{ }^\circ\text{C}$  while the outer surface dissipates heat by convection into ambient at  $30 \text{ }^\circ\text{C}$  with a heat transfer coefficient of  $20 \text{ W/ m}^2 \text{ }^\circ\text{C}$ . A 2 cm layer of insulation [ $k = 0.4 \text{ W/m } ^\circ\text{C}$ ] is used to reduce the heat loss from the pipe. **Determine** the percentage saving of heat by using this insulation.

..... (10 Marks)

**Question No. Two:** (A1.1, A1.2, B1.2)

**2.a Write** shot notes about simple Reynolds analogy. .... (5 Marks)

**2.b** Air is heated by passing through a 25 mm bore copper tube which is maintained at  $280 \text{ }^\circ\text{C}$ . The air enters at  $15 \text{ }^\circ\text{C}$  and leaves at  $270 \text{ }^\circ\text{C}$  with a mean velocity of 30 m/s. **Calculate:** the length of the tube and pumping power required. For turbulent flow in pipe  $f = 0.079 (\text{Re})^{-1/4}$ , all properties at mean film temperature. .... (10 Marks)

**Question No. Three:** (A1.2, A1.3, A1.4, B1.3)

**3.a Classify** the heat exchangers according to the flow arrangement. .... (5 Marks)

**3.b** A cross-flow heat exchanger with both unmixed fluids arrangement. Air enters at  $15 \text{ }^\circ\text{C}$  with 2.0 kg/s, while water enters at  $90 \text{ }^\circ\text{C}$  with 0.25 kg/s. The area of heat transfer is  $8.4 \text{ m}^2$  and the overall heat transfer coefficient is  $250 \text{ W/m}^2 \text{ }^\circ\text{C}$ .

**Calculate** the exit temperature of air and that of water. .... (10 Marks)

**Question No. Four:** (A1.1, A1.2, A1.6)

**4.a Define:** the Black body, the Grey body and reflection phenomena.  
..... (5 Marks)

**4.b** A ribbed cylinder of outside diameter 60 cm, its surface is at 260 °C, in a large room at 20 °C. The cylinder is 90 cm long and is made of casting iron of emissivity 0.8. The surface area of the ribbed cylinder is 5 m<sup>2</sup> and the heat transfer coefficient for convection may be taken as 8.8 W/m<sup>2</sup> °C. **Calculate** the total heat loss due to radiation and convection.  
..... (10 Marks)

**Question No. Five:** (A1.1, A1.2, B1.3)

**5.a Sketch** a typical pool boiling curve for water at atmospheric pressure.  
..... (5 Marks)

**5.b** Water is boiled at atmospheric pressure in a mechanically polished stainless steel pan. The inner surface temperature of the pan is maintained at 110°C. **Determine:** the rate of heat transfer to the water and the rate of evaporation of water.  
..... (10 Marks)

The heat flux during the nucleate boiling can be calculated from:

$$\dot{q}_{\text{nucleate}} = \mu_l h_{fg} \left[ \frac{g(\rho_l - \rho_v)}{\sigma} \right]^{1/2} \left( \frac{C_{p,l}(T_s - T_{\text{sat}})}{C_{sf} h_{fg} \text{Pr}_l^n} \right)^3$$



The film boiling heat flux can be determined by:

$$\dot{q}_{\text{film}} = 0.62 \left[ \frac{gk_v^3 \rho_v (\rho_l - \rho_v) [h_{fg} + 0.4C_{pv}(T_s - T_{\text{sat}})]}{\mu_v D (T_s - T_{\text{sat}})} \right]^{1/4} (T_s - T_{\text{sat}})$$

where  $C_{sf} = 0.0130$  and  $n = 1.0$  for the boiling of water on a mechanically polished stainless steel surface

With best wishes  
Dr Ahmed El-Kady



	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING</b>					
	PROGRAM/ YEAR	(NAVAL ARCHITECTURE AND MARINE ENGINEERING PROGRAM) 2020 - 2021	SEMESTER:	SECOND		
	COURSE TITLE:	SHIP DESIGN (1)	COURSE CODE:	NME 212		
<b>DATE:</b>	12 - 6 - 2021	<b>TOTAL ASSESSMENT MARKS:</b>	70	<b>TIME ALLOWED:</b>	3 HOURS	FRESH

ANSWER ALL QUESTIONS! NO. OF QUESTIONS: (4) NO. OF PAGES: (2)

**Question (1) (20 marks) ( $A_1, B_2, B_4, C_1$ )**

(a) Complete the following sentences: (10 marks)

- (1) The most common restriction for inland ships is .....
- (2) Design spiral approach endorses the concept that ship design process is ..... and .....
- (3) In the current tonnage regulations, one ton is equivalent to a volume of ..... cubic meters.
- (4) Detailed design stage is the final stage of ship design process and it is the ..... responsibility.
- (5) Alexander's formula could be used to determine ..... . This formula is a function of ship speed (V) and length (L)
- (6) Increase of ship ..... is the most expensive way to increase ship displacement ( $\Delta$ ).
- (7) ..... ratio is significant in relation to the structural strength of the ship. While, ship with a higher ..... ratio has a higher course keeping capability.
- (8) ..... is a useful drawing sometimes prepared in studies of ship capacity. It is quite similar to sectional area curve (SAC) and has the same ordinate and units.
- (9) ..... is the relationship between net capacity of all cargo compartments and payable deadweight.
- (10) ..... is the space occupied by the E/R added to other spaces which are necessary for propelling the ship.

(b) As a ship designer, what would you expect from the owner of a new project as main requirements? (4 Marks)

(c) Estimate ship principal dimensions and block coefficient ( $C_B$ ) for a single screw cargo ship has the following particulars: (6 Marks)

- Dead weight (Dwt) = 20000 tons
- Dead weight coefficient ( $C_{Dwt}$ ) = 0.7
- Service speed ( $V_S$ ) = 15 knots
- (B/T) Ratio = 2.5

**Use the following equations:**

$$C_B = 1.06 - 1.68 F_n, \quad B = 0.1L + 5.5 \quad \text{and} \quad D = \frac{B - 2.74}{1.4}$$

**Question (2) (15 marks) ( $A_1, B_4, C_1$ )**

- (a) What is a standard ship according to ICLL, 1966? (5 marks)
- (b) Why a freeboard of a liquid carrier is always less than that of a dry cargo ship? (5 marks)
- (c) Explain with the aid of a net sketch, how can we calculate mean sheer for a standard ship? (5 marks)
- .....

**Question (3) (15 marks) ( $A_1 - B_2$ )**

- (a) Define and explain briefly the following: (5 marks)
- (1) Ullage,  
(2) Capacity coefficient.
- (b) The following data are the ordinates of a fore wing tank measured from a longitudinal bulkhead, which is the interior side of the tank, outward to the shell plating, where the inner bottom is the bottom of that tank: (10 marks)

Station No.	Height (m)				
	(inner bottom) 1.5	2	2.5	3	3.5
1	1.8	1.9	2.02	2.16	2.32
2	2.07	2.17	2.29	2.43	2.59
3	2.4	2.5	2.62	2.76	2.92

If the longitudinal spacing is 2.0 m, find the volume of this tank and determine the position of its center.

.....

**Question (4) (20 marks) ( $A_1, B_4, C_1$ )**

- (a) Put ( X ) or (  $\checkmark$  ) and correct the wrong sentences – if any. (3 marks)
- (1) Tonnage is a weight measure, not a volume measure.  
(2) Port charges and canal dues are generally based on net tonnage. While, dry dock and towing charges are usually based on gross tonnage.  
(3) If the actual engine room tonnage amount to above 13% and under 20% the gross tonnage of the ship, the Propelling power allowance will be 32% of the gross tonnage.
- (b) Define and explain briefly the following: (5 marks)
- (1) Tonnage deck,  
(2) Gross tonnage,
- (c) What are the items under section 79 of IMO, 1959? (5 marks)
- (d) Draw the tonnage mark and state when it should be placed at the same level of the load line mark. (7 marks)
- .....

**Good Luck**

**Dr. M. M. Moustafa**



**PORT SAID UNIVERSITY  
FACULTY OF ENGINEERING  
DEPARTMENT OF ELECTRICAL ENGINEERING**

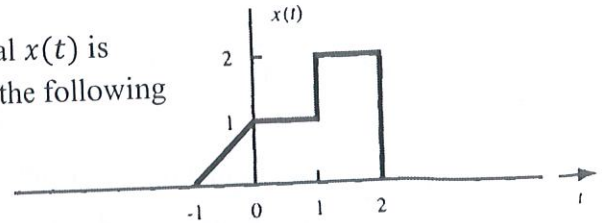


	PROGRAM/ YEAR	ELECTRICAL POWER 2020-2021	SEMESTER	SECOND-21
	COURSE TITLE:	SIGNALS AND SYSTEMS ANALYSIS تحليل اشارات و نظم	COURSE CODE:	ECE207
DATE:	12-06-2021	TOTAL ASSESSMENT MARKS:	75	TIME ALLOWED: 3 HOURS
				<b>FRESH</b>

**Question No. 1**

[22 Points]

a) [ILOS: A1.1, A2.1] [10 Points] A continuous-time signal  $x(t)$  is shown in the following figure. Sketch and label each of the following signals



- i)  $x(t)u(1-t)$
- ii)  $x(2t-1)\delta(t-5/4)$

b) [ILOS: A1.1, A2.1] [12 Points] The impulse response of a LTI system is given by  $h[n] = 2^n u[n]$ . The response of the system for a certain input is  $y[n] = \delta[n] + 4u[n] + u[n-10]$

- i) Plot each of  $h[n], y[n]$
- ii) If you know that  $y[n]$  is the response of the system for some **right sided input sequence**  $x[n]$ , (i.e.  $x[n] = 0$  for  $n < 0$ ). Use discrete convolution to determine  $x[n]$  sample values at  $n = 0, 1, \text{ and } 2$ .

**Question No. 2**

[23 Points]

a) [ILOS: A1.1, A2.1] [10 Points] Consider the LTI system characterized by the I/O relationship:

$$y(t) = \int_{t-2}^t x(\tau) d\tau$$

- i) Determine and plot the impulse response of the system  $h(t)$ .
- ii) Check the system for Causality and Stability.
- iii) Determine and plot the output  $y_1(t)$  when the input to the system is the rectangle pulse

$$x_1(t) = u(t) - u(t-1)$$

b) [ILOS: A1.1, A2.1] [13 Points] A signal  $x[n]$  is a sum of two discrete-time complex exponentials with frequencies  $\pi/2$  and  $\pi/3$ .

$$x[n] = e^{j(\frac{\pi}{3})n} + e^{j(\frac{\pi}{2})n} \quad (1)$$

- i) Is this signal periodic? if so, what is the period?
- ii) Consider this signal as an input to the following two systems:  
System 1:  $y[n] = x[n-1] + 2x[n] + x[n+1]$   
System 2:  $y[n] = x[2n]$

Check whether each of the two systems is linear, time-invariant or not? And find the output of the system for the input  $x[n]$  given in equation (1)

**Question No. 3**

- a) [ILOS: A1.2, A5.1] [10 Points] Complex Exponentials are considered Eigen functions for LTI systems,
- Explain this property by examining LTI system response to complex exponentials in continuous and discrete-time cases.
  - How can this property be used with Fourier analysis to determine the output of LTI systems for arbitrary inputs

- b) [ILOS: A1.2] [10 Points] Let

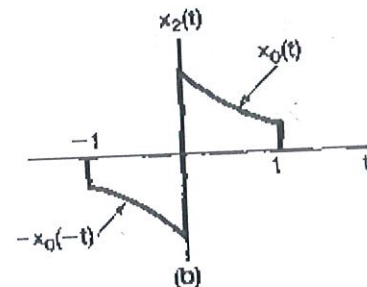
$$x(t) = \begin{cases} t, & 0 \leq t \leq 1 \\ 2 - t, & 1 \leq t \leq 2 \end{cases}$$



be a periodic signal with fundamental period  $T = 2$  and Fourier series coefficients  $a_k$

- Determine the value of  $a_0$ .
  - Determine the Fourier series representation of  $dx(t)/dt$
  - Use the results in part (ii) and the differentiation property of the continuous-time Fourier series to help determine the Fourier series coefficients of  $x(t)$
- c) [ILOS: A1.1, A1.2] [10 Points] Consider the signal

$$x_0(t) = \begin{cases} e^{-t}, & 0 \leq t \leq 1 \\ 0, & \text{elsewhere} \end{cases}$$

- Evaluate the Fourier transform of  $x_0(t)$
- Determine the Fourier transform of the signal  $x_2(t)$  shown in the figure below using the result of (i) and the properties of Fourier transform



	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF CHEMICAL ENGINEERING</b>				
	PROGRAM/YEAR	CHEMICAL ENGINEERING, 2020-21	SEMESTER	2 <sup>nd</sup>	
COURSE TITLE:	Environmental Science and Safety	COURSE CODE:	HUF 204		
DATE	14-06-2021	TOTAL ASSESSMENT MARKS:	40	TIME ALLOWED:	2 HOURS
Learning Outcomes (LO's)	Q1:A10 Q2:A6 Q3:A6				
Instructor	Prof. Mohamed Bassyouni				

## Final Exam

### Question # 1

**(12 MARKS)**

- (i) List types waste by US Environmental Protection Agency? *(5 Marks)*
- (ii) What is the different between threshold dose and threshold limit value ? *(3 Marks)*
- (iii) What is arbitrary sound wave of intensity of 10 planes? *(2 Marks)*
- (iv) According to the World Health Organization, what is the maximum sound level that shows no damage to living organisms? *(2 Marks)*

### Question # 2

**(15 MARKS)**

- (i) What is cohort study? *(2 Marks)*
- (ii) Name the difference between quantitative and qualitative analysis ? *(3 Marks)*
- (iii) Name and discuss water treatment processes? Process drawing is required? *(10 Marks)*

### Question # 3

**(13 MARKS)**

- (i) Name the biological treatment methods? Discuss one method? *(5 Marks)*
- (ii) Name main wastewater treatment stages? Drawing is required? *(8 Marks)*

(Time 2.0 hr)

**السؤال الأول (10 درجة) (A4.1,A6.1,A10.1,10.2):**

- 1- وضع بالرسم فنط :
  - Biological Spectrum .
  - دورة الماء ومصادره المختلفة.
  - اساليب الوتاية والسيطرة على التلوث الصناعي.
- 2- اذكر الاختبارات الكيمائية العضوية والغير عضوية للمياه مع شرح احداها.
- 3- وضع لماذا الإه نام بالبيئة وضرورة المحافظة عليها؟

**السؤال الثاني (8 درجة) (A4.2,A6.3,A10.1):**

اعد كتابة الجمل الالية مع تصحيح الخطأ بها إن وجد:



- البيئة يمكن وصفها بأنها مجموعة من الأنظمة المنفصلة والتي لا تؤثر على بقائنا في هذا العالم الصغير والتي لا تتعامل معها بشكل دوري.
- وتقدر كمية الماء الموجودة في المحيطات بحوالي 50% من كمية الماء على سطح الأرض.
- تحتوي المياه الجوفية على المواد العالقة والبكتريا ونسبة صغيرة من الكالسيوم والماغنسيوم والمنجنيز والحديد.
- المياه النقية الصالحة للاستخدام (Safe Water) وهو الماء الخالي من الجراثيم ومن المواد المعدنية الذائبة التي تكسبه لوناً أو تجعله غير صالح للاستعمال أو غير مستساغ الطعم والرائحة.
- يدل وجود الأروتيت ( $\text{NO}_2$  - Nitrates) على نشاط بكتيري في أكسدة النوشادر ويدل على تلوث قديم.
- (Permanent Resources) وهي الموارد الطبيعية التي تمتلك خاصية التجديد ذاتياً ويمكن إثارؤها وإعادة إنتاجها.
- وتشمل الكائنات الحية،كالأسماك والأشجار والتربة والمياه.
- وتتراوح نسبة المواد الصلبة العالقة في الماء من 65-75% من مجموع المواد الصلبة بينما تكون المواد الصلبة الذائبة من 25-35%.
- (BOD) يستدل منه على تركيز المواد الكربونية في العينة ويجب أن يكون أعلى من  $\text{COD}_5$ .

**السؤال الثالث (12 درجة) (A4.3,A6.3,A10.1):**

- 1- ما هي الدراسات اللازمة لتقدير استعمالات المياه.
- 2- اذكر ما تعرفه عن :
  - تقسيم المياه بالنسبة لصلاحيتها.
  - دورة النيتروجين.
  - دورة الفسفور.
  - دورة الكبريت.
- 3- اذكر تلوث المياه وطرق للسيطرة عليه.
- 4- اذكر اسباب تلوث التربة وكيفية السيطرة عليه.

**السؤال الرابع (10 درجة) (A4.1,A6.2):**

- 1- ما هي عمليات تقييم المخاطر والغرض منها وفقاً لمعايير الأمن والسلامة المهنية.
- 2- اذكر اشتراطات امن والسلامة لكل مما يلي:
  - التوصيات المتعلقة بتكوين المبنى.
  - التوصيات المتعلقة بمسالك الهروب.
- 3- اذكر باختصار أنواع مهمات السلامة الشخصية.

	Port Said University Faculty of Engineering Department of Electrical Engineering					
	PROGRAM/YEAR	(COMPUTER&CONTROL) 2020-21	SEMESTER	SECOND		
	COURSE TITLE:	<b>Introduction to Database</b>	COURSE CODE:	CCE210		
Date	16 JUN 2021	TOTAL ASSESSMENT MARKS:	60	TIME ALLOWED:	3 HOURS	FRESH

**The Exam is in 2 Pages.**

**Question 1: [Los: A2.1&A2.2]**

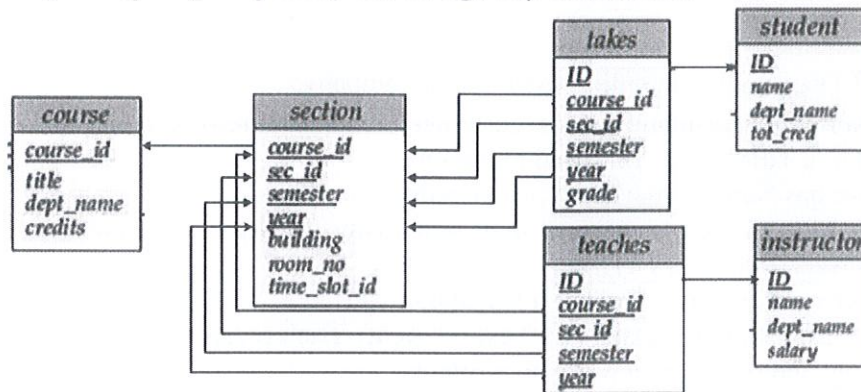
**[15 Marks]**

- 1) Define the following terms: *data model, data definition language DDL, data manipulation language DML, metadata.* [4 Marks]
- 2) List the disadvantages of using file systems. . Write one sentence about each one. [3 Marks]
- 3) List the Database Design phases. Write one sentence about each phase. [4 Marks]
- 4) Classify the Database Systems based on User Numbers and Database Distribution. Write one sentence about each one. [4 Marks]

**Question 2: [Los: A2.3&A3.1]**

**[15 Marks]**

- 1) Write the appropriate SQL DDL statements for declaring the *student, takes, and section* relations of the following schema diagram. Specify the primary and foreign-key declarations. [3 Marks]



- 2) For the previous schema, write the following SQL queries: [12 Marks]
  1. List the entire instructor relation in descending order of salary, if several instructors have the same salary, we order them in ascending order by name.
  2. Find the names and average salaries of all departments whose average salary is greater than 70000.
  3. Find all courses whose identifier starts with the string "CS-1"
  4. Give a 5 percent salary raise to instructors whose salary is less than average salary of all instructors.
  5. Delete all tuples in the instructor relation who work on the Finance department.
  6. Add the fact that there is a course CS-437 in the Computer Science department with title "Database Systems", and 4 credit hours.

**Question 3: [Los: C1.1&C7a.1&C7b.1]**

**[15 Marks]**

- 1) Explain the distinctions among the terms primary key, candidate key, and super key. [3 Marks]
- 2) Define the term cardinality and list the types of cardinality for binary relationships. [2 Marks]
- 3) Consider the following relational schema that keeps track of Movies, Movie Stars and Studios.

*Movie*(movieTitle, movieYear, length, studioName, profits)  
*StarsIn*(movieTitle, starName, movieYear)  
*Star*(starName, address, gender, birthdate)  
*Studio*(studioName, address, president\_name)

Movie stores information about movies, Star about actors/actresses, Studio about different studios, and StarsIn about the movies for each actor/actress. Write the following SQL queries for the Movie database:

- a) Express this database using a **schema diagram** that indicates primary and foreign keys (assume the appropriate foreign keys)
- b) Find the names and addresses of the stars who live in Hollywood (i.e., they have `Hollywood` in their address).
- c) Find the names of stars who have appeared in at least one movie where the profits were greater than 100M.
- d) Find the names of stars who appear in a movie and they are also the president of the studio producing this movie. (Hint: this is different from just looking for stars who are also presidents.)
- e) For each star find the average profit of the movies he has appeared in and display it only if the sum of the profits of the movies he has appeared in is more than 2M. [10 Marks]

**Question 4: [Los: C1.1&C7a.1&C7b.1]**

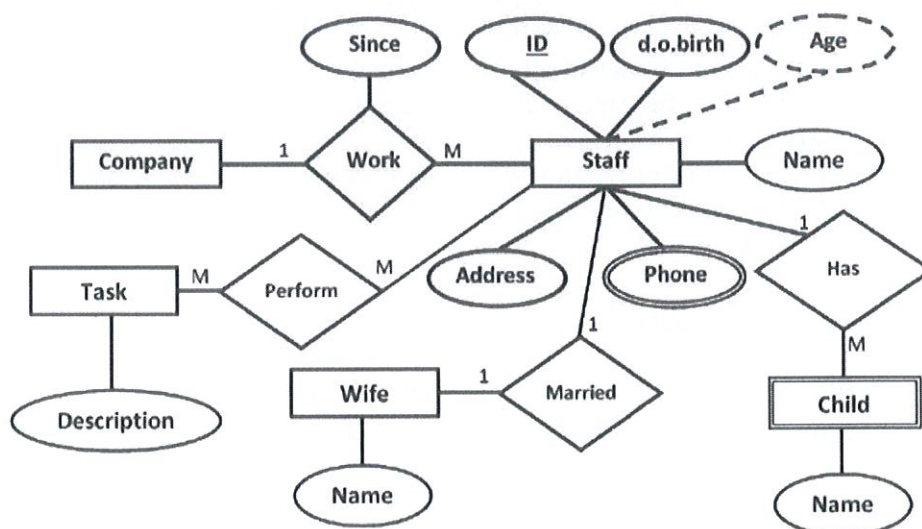
[15 Marks]

- 1) A company database needs to store information about employees (identified by `ssn`, with salary and phone as attributes); departments (identified by `dno`, with `dname` and budget as attributes); and children of employees (with name and age as attributes). Employees work in departments; each department is managed by an employee; a child must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known. We are not interested in information about a child once the parent leaves the company. Draw an ER diagram that captures this information. [5 Marks]


- 2) Design an E/R Diagram for an online video rental company:

- 1. The company has data about movies, customers, rentals, reviewers, reviews.
- 2. A Movie has a Title (key), Year, and Duration.
- 3. A Customer has Name, Email (key), and Credit.
- 4. Customers rent movies; customers may rent many movies, and a movie may be rented by many customers; each Rental has a Date.
- 5. A Reviewer is a Customer, and has a Reputation attribute.
- 6. A Review has a Rating, a Date, and Text (content). Each review is uniquely identified by the movie it is reviewing, and by the reviewer who wrote it. [5 Marks]

- 3) Convert the following ER diagram into a relational schema. [5 Marks]



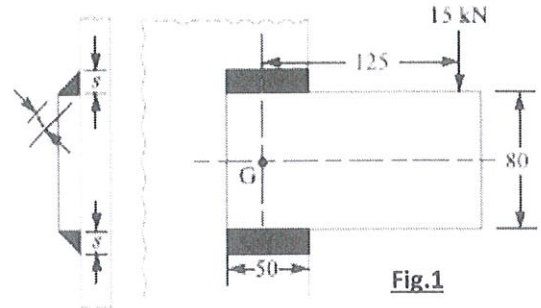


	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>NGEP</b>				<b>NGEP</b>	
	PROGRAM/YEAR	Production Engineering, 2020-21	SEMESTER	First		
	COURSE TITLE:	Stress analysis and Machine Design	COURSE CODE:	PRD225		
DATE	16-06-2021	TOTAL ASSESSMENT MARKS:	70	TIME ALLOWED:	3 HOURS	FRESH
Instructor	Dr. Gamal Abdel Nasser					

**Assume any missing data:**

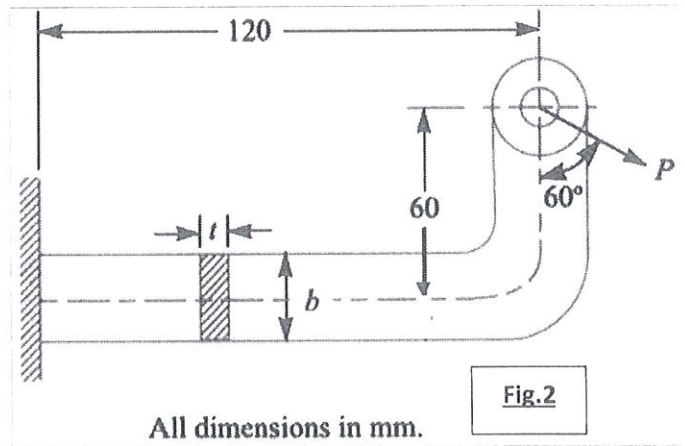
**Problem (1) (15marks) (A8D1)**

A bracket carrying a load of 15kN is to be welded as shown in Fig.2. If the polar moment of inertia is  $127850 S \text{ mm}^4$ , where (S) is the weld size and the allowable shear stress is not to exceed 80MPa, find the size of weld required.



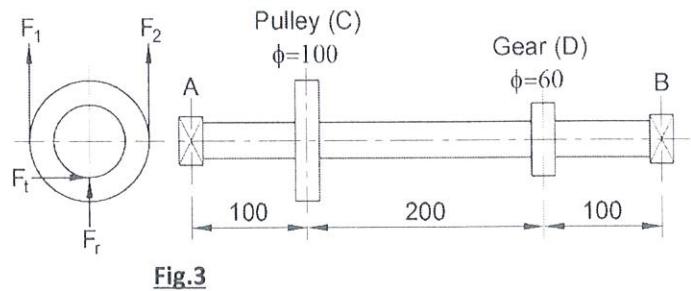
**Problem (2) (15marks) (A3C13)**

A wall bracket, as shown in Fig.2, is subjected to a pull of P is 5kN, at 60° to the vertical. The cross-section of bracket is rectangular having  $b=3t$ . Determine the dimensions of b and t if the stress in the material of the bracket is limited to 28MPa.



**Problem (3) (15marks) (A3C13)**

The shaft shown in Fig.3 is supported on two bearings A and B and it is made of heat treatable steel,  $\sigma_y=370\text{MPa}$ . The shaft receives 7.5KW power at 1500rpm from a flat belt pulley C to the spur gear D as shown. The tangential and radial forces  $F_t$  and  $F_r$  acting on spur gear are 1590N and 580N respectively. The pulley has a ratio of belt tension 3, (i.e.;  $F_1/F_2=3$ ). Calculate the diameter of the shaft taking a factor of safety of 2.





**Problem (4) (15 marks) (A8D9)**

A cylindrical pressure vessel with 300mm internal diameter is used to store a constant pressure of  $P_i=28\text{bar}$ . The cylinder cover is fastened to the vessel by a number of bolts (n) M16. Each bolt is tightened initially by a force of  $F_c=35\text{kN}$ . The material class of the bolts is 8.8 with  $\sigma_y=640\text{MPa}$ . The stiffness of the bolt  $C_s=200\text{kN/mm}$  and of the tight parts is  $C_p=400\text{kN/mm}$ . Find the required number of bolts (n) to withstand the initial and working load based on factor of safety F.S.=2. Also, draw the actually force deformation diagram (to scale) for the screw joint showing all forces and deformations.

**Problem (5) (10 marks) (A3C13)**

For a small element with the state of plane stress as  $\sigma_x=+30\text{MPa}$ ,  $\sigma_y=+50\text{MPa}$ ,  $\tau_{xy}=+25\text{MPa}$ , determine the stresses acting on the inclined plane by  $\theta=+30^\circ$  with horizontal-direction. Represent your results on a stress element.

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>CIVIL ENGINEERING DEPARTMENT</b>					
	PROGRAM/ YEAR	(CIVIL ENG.) / 2 <sup>nd</sup> YEAR	SEMESTER	Second		
	COURSE TITLE:	Surveying (2)	COURSE CODE:	CIV219		
DATE:	16 JUNE-2021	TOTAL ASSESSMENT MARKS:	60	TIME ALLOWED:	3 HRS	2021

**Question (1) (12 marks)**

- a) For any reference ellipsoid if  $N = \frac{a^2}{\sqrt{a^2 \cos^2 \phi + b^2 \sin^2 \phi}}$  proof that  $N = \frac{a}{\sqrt{1 - e^2 \sin^2 \phi}}$
- b) Write short notes about: UTM, Ambiguity, VRS, and RINEX
- c) Describe the different types of the map projections.
- d) The source of errors associated with GPS observations and how can you reduce each type of error when use phase observation.

**Question (2) (12 marks)**

A containership started a trip from port A of geographic coordinates (32° 25' N , 23° 11' E, 10m) toward port B of geographic coordinates (60° 12' N , 45° 54' E, 20m) with average speed 100 km/hr. After 4 hours the pilot was ordered to return back to port A to bring more containers. The ship continued the trip again but it will stop first at port C with Cartesian coordinates (3185050m, 3185050m, 4504340.907m) to unload some containers then go to port B. considering the datum is sphere calculate the following: -

- a) The total length of the trip from start until reaching the final destination at port B.
- b) The linear distance between port A and port C.

**Question (3) (12 marks)**

Point	Latitude	Longitude	Height(m)
A	35° 20' 10" N	135° 25' 11" E	152.5
B	75° 20' 10" N	26° 25' 61" E	12.146

The above table shows the geodetic coordinates of three GPS stations, using these coordinates calculate the followings: -

- 1- The Geodetic coordinates of point A in Helmert 1906 (a=6378200 m, f=1/298.3) if the given coordinates in WGS84 ellipsoid (a=6378137 m, f=1/298.257). The three transformation parameters between the two systems are:  $d_x = -270.9$  m,  $d_y = +115.6$  m,  $d_z = -360.2$  m.
- 2- The distance between point A and B considering the datum is ellipsoid WGS84.
- 3- The average radius of curvature of the above ellipsoid at point A in ellipsoid WGS84.

**Question (4) (12 marks)**

The following table shows the observations of GPS satellites observed from stations A&B

Station A	C/A code	L1	L2	P code
21	24221942.92	112588.24	63360.13345	24221952.25
10	21753025.85	-3662085.529	-2798011.697	21753031.85
3	24266251.97	-391180.446	-195234.0095	24266269.28
Station B	C/A code	L1	L2	P code
21	24228179.32	145360.996	88897.43545	24228187.33
10	21743365.91	-3712849.632	-2837568.196	21743372.22
3	24230397.06	-579593.754	-342049.1645	24230418.15

Calculate the following:

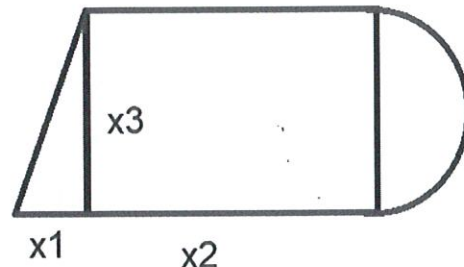
- What are the characteristics of linear combinations (5, -4).
- The single differences C/A code between the two satellites 10&21 and station B.
- The single difference phase L2 between the satellite 3 and the two stations A&B.
- The double difference Phase LI between the two satellites 3&10 and the two stations A&B.
- Neglecting the phase observations errors, estimate the L2 float ambiguities for station A which has Cartesian coordinates (4072587, 621656, 4853112) and the three-dimensional coordinates of the satellites are:

Satellite	X	Y	Z
21	19346227	-7470629	16739447
10	12545754	21630765	8771631
3	10219598	11722445	21678012

**Question (5) (12 marks)**

- The following measurements were taken for a construction site shown in the figure. The measured dimensions together with the standard deviations are:

$$X_1 = 30 \pm 0.3 \text{ m}, X_2 = 20 \pm 0.2 \text{ m}, X_3 = 10 \pm 0.1 \text{ m}$$



- Compute the total area (A) and its accuracy.
- Compute the variance- covariance matrix for the computed areas.

End of Exam

*Prof. Dr. Eng. Ahmed I Elbattab*

*Dr. Eng. Marwa Azzam*



**PORT SAID UNIVERSITY  
FACULTY OF ENGINEERING  
DEPARTMENT OF ELECTRIC ENGINEERING .**



	PROGRAM/ YEAR:	2 nd (Electrical Power)		SEMESTER	FIRST	
	COURSE TITLE	ELECTRICAL POWER (1)		COURSE CODE	EPM211	
DATE :	19/6/2021	TOTAL ASSESMENT MARKS	70	TIME ALLOWED	3 HOURS	FRESH

**Questions (1) [15marks] [ A1 A3 A10 B1 ]**

1-1 Derive an expression for the capacitance of a unsymmetrical three phase line .

1-2 A three-phase 132 kv, 50 Hz line consists of three conductors each diameter of 21mm. The spacing between the conductors is as follows: A-B=3m, B-C=5m, C-A=3.6m Calculate (1) the inductive reactance per phase per km, (2) line-to-line capacitance, (3) capacitive susceptance to neutral per km, (4) the charging current per km, (5) the reactive power generated per km

**Questions (2) [20marks] [ B1 A3 B2 C1 ]**

2-1 Deduce an approximate expression for the voltage drop in a short T.L.

2-2 Draw and explain the phasor diagram for a transmission line assuming that half the capacitance is concentrated at each end of the line.

2-3 A three phase 110 KV transmission line is connected to a 50 MW load at a power factor of 0.85 lagging . The line constant of the 80 km long line are  $Z = 96 \angle 78^\circ \Omega$  and  $Y = 0.001 \angle 90^\circ S$ . Using nominal T circuit representation , calculate (a) the A, B, C and D ; (b) sending end voltage ; (c) sending end current; (d) sending end power factor; (e) regulation and efficiency of transmission.

**Questions (3) [15 marks] [ C1 C2 A10 B1 ]**

**3-1 Complete**

1- Transposition of a three phase transmission line helps in - - - - - .

2- Inductance per conductor of a three phase symmetrically spaced line is - - - - - to inductance per conductor of a single phase line .

3- If capacitance between two conductors of 3-phase line is  $8 \mu F$  , then capacitance of each conductor to neutral is - - - - - .

4- Inductance of unsymmetrical three phase line is equal - - - - - .

5- Capacitance of symmetrical three phase line is equal - - - - - .

6- The expression for electric potential at a conductor in a group of charged conductors is equal - - - - - .

7- The dimension of constants B and C are respectively - - - and - - - .

8- In a transmission line, generalised circuit constant - - - and - - - are equal.

3-2 Determine the symmetrical component of voltages in a three phase system, the original phases of which are  $V_a=12+j6$ ,  $V_b=12-j12$ ,  $V_c=15+j10$ . If symmetrical components of current gave by  $I_{a0} =30 \angle 30$ ,  $I_{a1}=450 \angle 0$ ,  $I_{a2}=225 \angle 450$ , Determine the complex power by (a) symmetrical components.

Questions (4) [20 marks] [ A1 A3 C2 C1 ]

4-1 Show that the per-unit equivalent impedance of a two winding transformer is the same whether the calculation is made from the high voltage side or the low voltage side.

4-2 Write short account about:

1 - Skin effect 2- Stranded conductor 3-Charging current 4-Ferranti effect

4-3 For the system shown in Fig.1. Draw the per unit impedance diagram. and determine the actual generator terminal voltage. Take the base KV=20, MVA=100 from the generator .

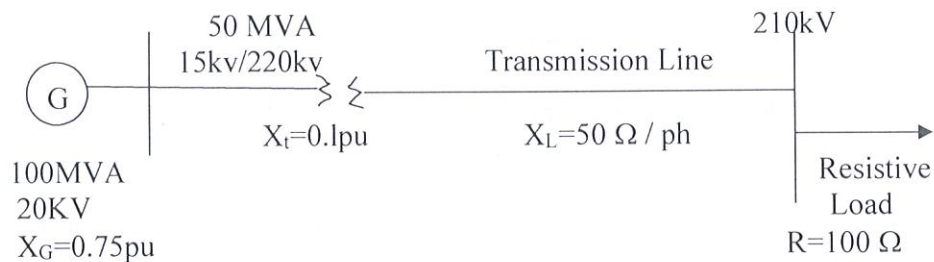


Fig.1.



**PORT SAID UNIVERSITY**  
**FACULTY OF ENGINEERING**  
**PRODUCTION ENGINEERING & MECHANICAL DESIGN DEPARTMENT**



	PROGRAM/ YEAR	SECOND YEAR, MECHANICAL POWER 2020/2021	SEMESTER	SECOND	
	COURSE TITLE	Machine Design	COURSE CODE	PRD224	
DATE	19/6/2021	TOTAL ASSESSMENT MARK	70	TIME ALLOWED	3 HOUR
					FRESH

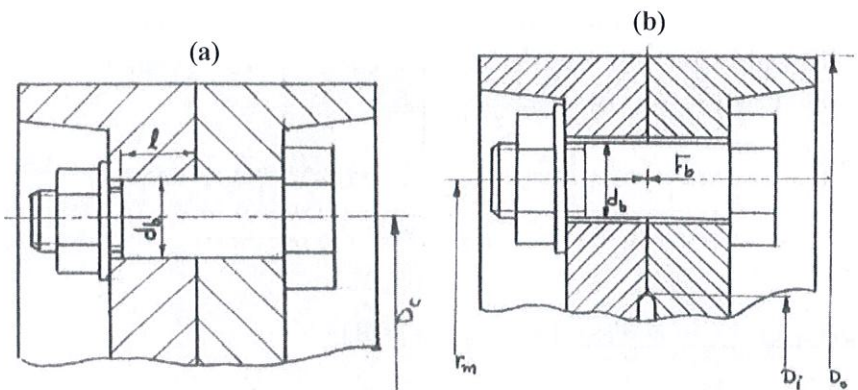
**It is allowed to use the design data sheets. Assume reasonable value for any missing data**  
الوحدات مهمة جدا والخطأ فيها أو عدم كتابتها له تأثير سلبي على الدرجات

**Question 1 (16 marks): [A1.2, B1.1, B4.1]**

1- The figures (a – b) show two methods for connection the flanges of the flange coupling

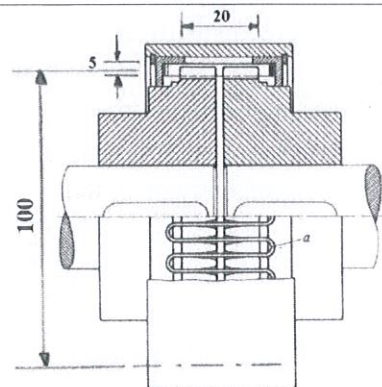
$r_m = 100 \text{ mm}$  ,  $d_b = 12 \text{ mm}$ ,  $l = 12 \text{ mm}$ ,  
 $m_m = 4$ ,  $M_t = 500 \text{ Nm}$ ,  $\mu = 0.1$

Specify the type of bolt and calculate the stresses acting on the bolts in each method

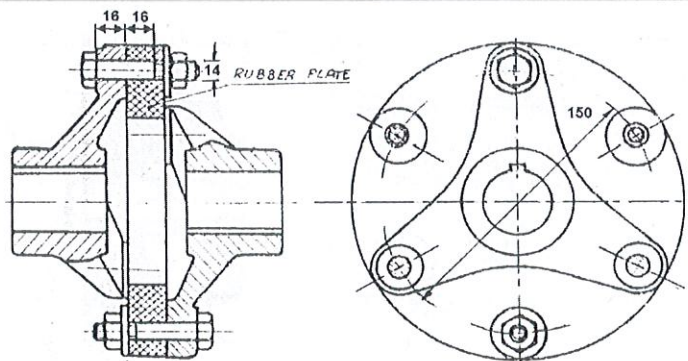


2- The steel-flex coupling has a steel grid of dimensions  $t \times b = 2 \times 5 \text{ mm}$ . The steel grid has an allowance bending stress of 150 MPa.

How many grooves should the steel grid passed through the two flanges to transmit torque of 80 N-m?



3- Calculate the torque which can be transmitted by Flexible Disk Coupling. The allowable surface pressure of rubber  $P_{s \text{ all}} = 2 \text{ MPa}$



(1/2) See the second page

**Question 2 ( 10 marks): [A1.2, B1.1, B2.1]**

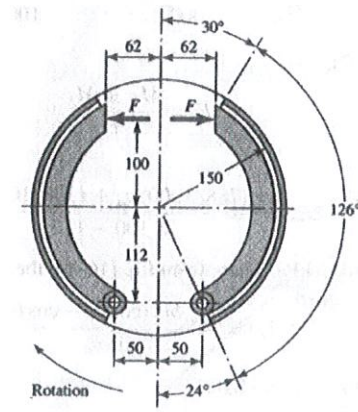
A multi- disc friction clutch has three discs on the driving shaft and two discs on the driven shaft. The dimensions of the discs are:

For inner disc;  $d_o=220$ ,  $d_i=140$  mm, For outer disc;  $d_o=236$ ,  $d_i=150$  mm

Calculate the power transmitted by this clutch at 550 rpm, if the surface pressure between the discs should not exceed 0.35 MPa and the coefficient of friction is 0.25. Use **uniform pressure assumption**.

**Question 3 ( 10 marks) [A1.2, B1.1, B2.1]**

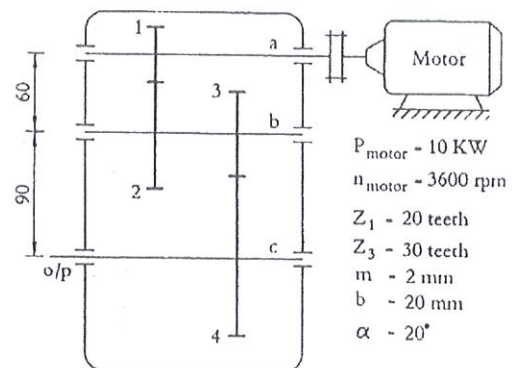
The figure shows an internal shoe brake having an inside rim diameter of 300 mm. The shoe has face width of 32 mm and are both actuated by a force (F) of 2.283 kN. The lining is molded asbestos having a coefficient of friction of 0.32. Find the maximum pressure and braking capacity.



**Question 4 ( 10 marks): [A1.2, B1.1, B2.1]**

For the shown gear box; Calculate:

- 1- The number of teeth of gears (2, 4).
- 2- The speed of shafts (b, c).
- 3- Illustrate the force acting on shaft (b).
- 4- The bending stress on teeth of gear (1) for moderate application and AGMA quality number of  $Q=5$ . All gears are accurately mounted.



**Question 5 ( 10 marks): [A1.2, B1.1, B4.1]**

A 30 kW motor drives a compressor by means of a flat rubber belt (HGL). Pulley diameters are 250 and 1000mm. Belt speed is 15 m/sec and the center distance is 2m. Belt thickness 7 mm and the coefficient of friction between the belt and the pulley is 0.35

- a- Determine the speed of the two shafts if the slip ratio 2%
- b- Calculate the number of crossing of the belt
- c- Find the width of the using belt



**Question 6 (14 marks): [A1.1, B3.1, B4.1]**

- a- For a 6208 rolling bearing find the radial load that can be carried for a life of 5000 hours at 900 rpm.
- b- Two deep groove ball bearing bearings supporting a 1000 rpm shaft and gear. The fixed bearing on the left has a code no. of 6310 and it carries 5 KN radial load and 1.5 KN axial load. Calculate the bearing life in hours.

(2/2) End of Questions

With my best wishes

Dr. Eng. Samar El Sanabary

	Port-Said University - Faculty of Engineering Chemical Engineering Department.			
	Year : 2020-2021	Final exam second Term	2 <sup>nd</sup> year Chemical Engineering	
	Code: CHE207		Biochemical Engineering	
Time : 3 hrs	Total marks: 75	Date : 19/06/2021		



**Answer Only Five questions**

1. Write on the following topics: (15 marks)
  - A- Peptides secondary structure.
  - B- Acid base behavior of amino acids.
  - C- Advantages and disadvantages of biochemical processing.
  
2. Write short note on **ONLY THREE** of the following (15 marks)
  - A. Enzymes increase the rate of a biochemical reaction
  - B. Theories of enzyme action.
  - C. Enzyme properties (denaturation- regulation- specificity – inhibition – effect of heat – enzyme and substrate concentration – effect of pH (**CHOOSE ONLY TWO**)).
  - D. Enzyme immobilized.
  
3. Write on **ONLY TWO** of the following (15 marks)
  - A. Describe the basic functions of fermenters.
  - B. Draw **ONLY TWO** of the following biochemical fermenters showing all basic functions of a fermenter with a brief explanation on the drawing.  
 Plug flow fermenter- Tower fermenter- Airlift Fermenter – Packed bed fermenter.
  - C. Draw a stirred tank biochemical fermenter showing all basic functions of a fermenter with a brief explanation on the drawing.
  
4. Write on the following (15 marks)
  - A. Ion-exchange chromatography is an important technique in some biochemical industries, describe in details the sequence of ion exchange purification technique.



- B. Define the metabolic pathways in microorganisms then describe the Embden-Meyerhof-Parnas (EMP) glycolysis pathway.
  - C. Metabolites can be used in biochemical industries, define metabolites, primary and secondary metabolites give examples for the production of important chemicals using glycolysis.
5. Write on the following (15 marks)
- A. Describe a method for the production of citric acid write a schematic sketch for the sequential purification of the fermented broth.
  - B. Citric acid is produced from *A. niger* explain the biochemistry of fermentation.
  - C. Food fermentation.
6. Write on the following (15 marks)
- A. Draw a flow chart of a production process in a typical biochemical establishment.
  - B. Ethanol production by Fermentation.

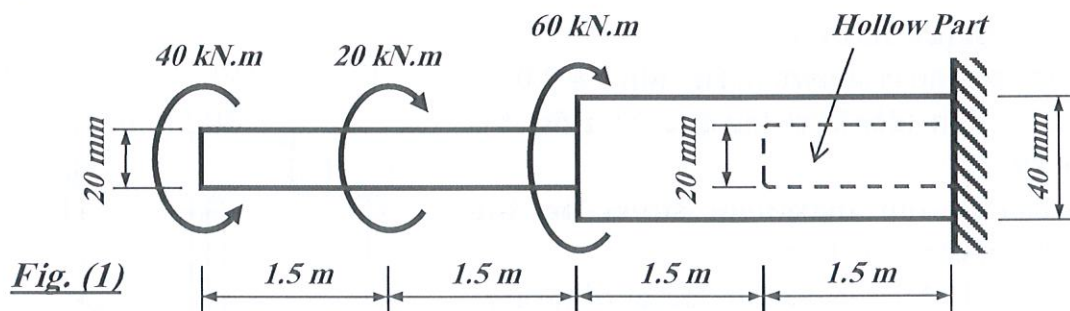
Good Luck

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF CIVIL ENGINEERING</b>					
	PROGRAM/ YEAR:	CIVIL ENGINEERING / 2020 - 2021 SECOND YEAR	SEMESTER:	SECOND		
	COURSE TITLE:	STRUCTURAL ANALYSIS (4)	COURSE CODE:	CIV216		
DATE:	Wed, 23 - 6 - 2021	TOTAL ASSESSMENT MARKS:	70	TIME ALLOWED:	3.00 HOURS	2014 Syllabus

*Attempt All Questions - Examiners A. Prof. Ashraf El-Sabbagh - A. Prof. Tarek Sharaf*

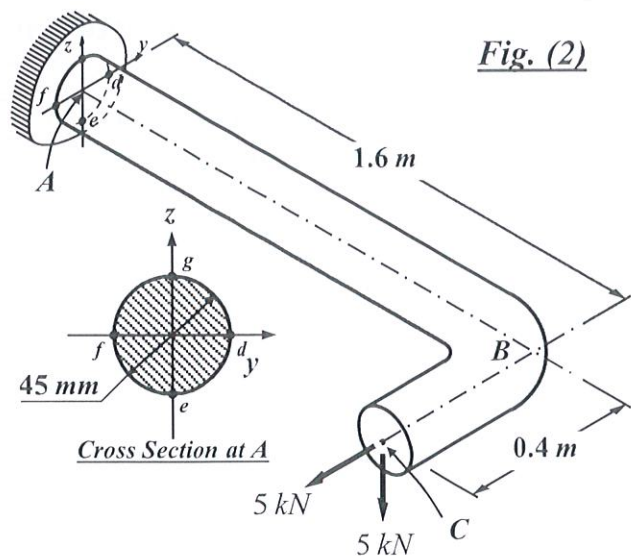
**Question (1): (15 marks)**

Figure (1) shows a circular steel shaft, it is required to compute and draw torsion diagram, and twist angle diagram, then compute the maximum shear stresses on all the cross-sections and sketch the stress distribution on these cross-sections. ( $G = 80 \text{ GPa}$ )



**Question (2): (20 marks)**

A horizontal bracket ABC shown in Fig. (2) consists of two perpendicular arms AB and BC, of 1.6 m and 0.4 m in length respectively. The Arm AB has a solid circular cross section with diameter equal to 45 mm. It is required:



- (6 marks) Compute the maximum shear stress on the circular cross-section at point (A) then sketch the expected resultant shear stress distribution.
- (4 marks) Compute the maximum normal stresses on the circular cross-section at point (A) then sketch the expected normal stress distribution.
- (6 marks) Determine analytically the principal stresses and the maximum shear stresses and show their directions at points (f) and (g).
- (4 marks) Check graphically the results at point (g) using Mohr's circle.

**Remarks:**

1- student may use the principal of superposition.

2- Maximum shear stress on circular section  $\tau = \frac{4Q}{3A}$

3- Torsional shear stress on circular section  $\tau = \frac{TR}{J}$

**Question (3): (15 marks)**

Figure (3) shows a beam (a-b-c-d), using The Method of The Equation of Three Moments, it is required to compute and draw B.M.D, S.F.D.

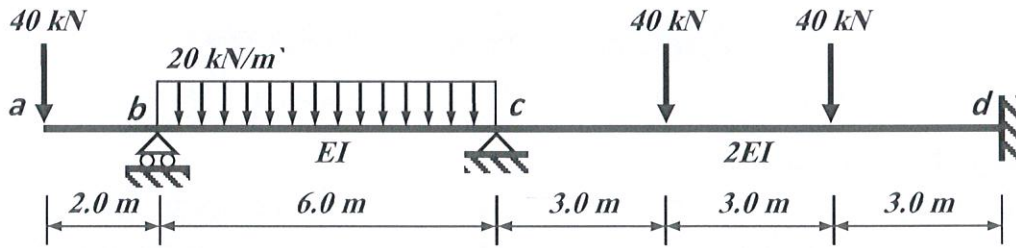


Fig. (3)

**Question (4): (20 marks)**

Pin-ended column is shown in Fig. (4),  $L = 8.0 \text{ m}$ ,  $E = 205 \text{ GPa}$ . Consider buckling about x-axis, it is required to:

- 1) Calculate the maximum stress on the column cross section.
- 2) If  $\sigma_y = 310 \text{ MPa}$ , calculate factor of safety.
- 3) Check the relationship between  $P_y$  and  $P_{cr}$ , draw the relationship between  $P$  and  $L/r$ .

Given that:

$$\sigma_{max} = \frac{P}{A} \left[ 1 + \frac{ec}{r^2} \sec \left( \frac{L}{2r} \sqrt{\frac{P}{EA}} \right) \right]$$

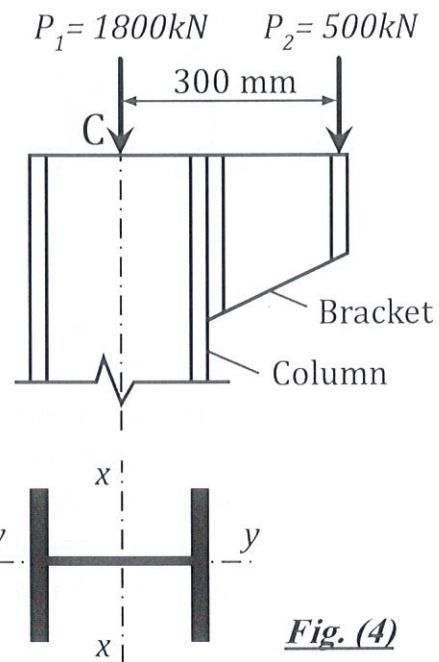




Fig. (4)

For cross-section W360×122  
 $A = 155.5 \text{ cm}^2$   
 $r_x = 15.4 \text{ cm}$   
 $I_x = 36700 \text{ cm}^4$   
 $c = 36.3/2 = 18.17 \text{ cm}$

*Best Wishes,*

*A. Prof. Ashraf El-Sabbagh - A. Prof. Tarek Sharaf*

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF PRODUCTION ENGINEERING AND MECHANICAL DESIGN</b>					
	PROGRAM/ YEAR	2 <sup>nd</sup> YEAR PRODUCTION ENGINEERING 2020-2021	SEMESTER	SECOND		
DATE:	23 <sup>rd</sup> JUNE 2021	COURSE TITLE:	Theory of Machines	COURSE CODE:	PRD220	FRESH
		TOTAL ASSESSMENT MARKS:	90	TIME ALLOWED:	3 HOURS	

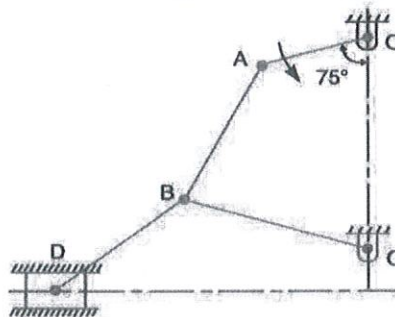
**Answer all the Following Questions**

**Question (1) (25 marks) (LO's A5.1, A7.1, and A10.1)**

- (a) What are the types of links?
- (b) Explain the term kinematic pair. Give the classification of kinematic pairs.
- (c) What are plane, rectilinear and curvilinear motions?
- (d) What is a mechanism? Differentiate between a mechanism and a structure.
- (e) Make classification of cam followers.
- (f) Explain the following terms of gears with drawing:
  1. Pitch circle
  2. Module and circular pitch
  3. Diametral pitch
  4. Addendum and addendum circle
  5. Dedendum and dedendum circle

**Question 2 (15 marks) (LO's B1.1, B2.1, and B4.1)**

In Fig.1, the angular velocity of the crank OA is 600 r.p.m. Determine the linear velocity of the slider D and the angular velocity of the link BD, when the crank is inclined at an angle of  $75^\circ$  to the vertical. The dimensions of various links are: OA = 28 mm; AB = 44 mm; BC 49 mm; and BD = 46 mm. The center distance between the centers of rotation O and C is 65 mm. The path of travel of the slider is 11 mm below the fixed point C. The slider moves along a horizontal path and OC is vertical.



(Fig.1)

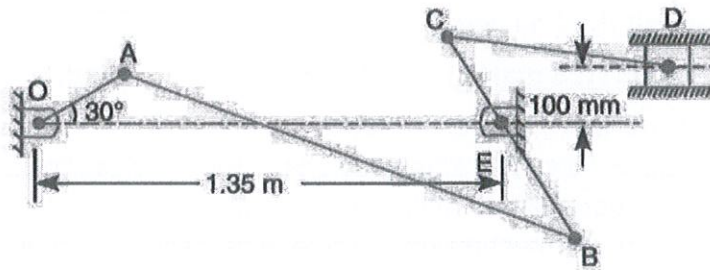
**Question (3) (20 marks)**

(LO's B1.1, B2.1, and B4.1)

A mechanism, as shown in Fig.2, has the following dimensions:  $OA = 200$  mm;  $AB = 1.5$  m;  $BC = 600$  mm;  $CD = 500$  mm and  $BE = 400$  mm. Locate all the instantaneous centers.

If crank  $OA$  rotates uniformly at 120 r.p.m. clockwise, find:

1. The velocity of  $B$ ,  $C$  and  $D$ ,
2. The angular velocity of the links  $AB$ ,  $BC$  and  $CD$ .



(Fig.2)

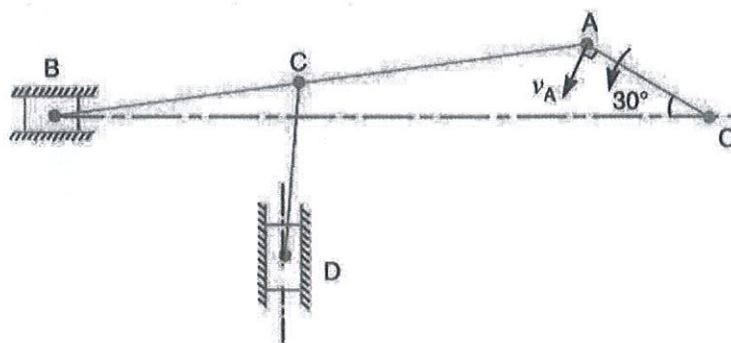
**Question (4) (30 marks)**

(LO's B1.1, B2.1, B4.1, and C2.1)

In the mechanism, as shown in Fig.3, the crank  $OA$  rotates at 20 r.p.m. anticlockwise and gives motion to the sliding blocks  $B$  and  $D$ . The dimensions of the various links are  $OA = 300$  mm;  $AB = 1200$  mm;  $BC = 450$  mm and  $CD = 450$  mm.

For the given configuration, determine:

1. Velocities of sliding at  $B$  and  $D$
2. Angular velocity of  $CD$
3. Linear acceleration of  $D$
4. Angular acceleration of  $CD$



(Fig.3)



PORT- SAID UNIVERSITY  
FACULTY OF ENGINEERING  
DEPARTMENT OF PHYSICS AND MATHEMATICAL ENG..



YEAR: 2<sup>nd</sup>

حَا اللّٰك ك

SEMESTER:  
2<sup>nd</sup> term 2020-2021

COURSE TITEL: Statistical & Probability

Pages: 2

DATE: 23 /6 / 2021

TOTAL MARK: 70

TIME: 3 HOURS

**Question(1)**

a) Thirty AA batteries were tested to determine how long they would last. The results, to the nearest minute, were recorded as follows:

421, 368, 388, 411, 388, 384, 371, 376, 389, 409, 392, 408, 422, 401, 363, 381, 405, 382, 400, 381, 389, 415, 428, 422, 386, 372, 410, 419, 386 and 390.

Group the data with interval width 10. and find mode, median, mean and variance.

b) From above sketch pie chart, bar chart and line graph

**Question(2)**

i) If  $f(x)$  is p.f. find  $c$ ,  $E(x)$ ,  $v(x)$  and  $p(1 < x < 4)$

X	0	1	2	3	4
F(x)	$C^2$	$C^2$	$C^2 - C$	$C^2 - C$	$C^2 - 2C$

$$i) f(x) = \begin{cases} \frac{2x}{c} & 0 < x < 1 \\ \frac{3x^2}{c} & 1 < x < 5 \\ 0 & \text{else where} \end{cases}$$

**Question(3)**

a) Die is weighted so that the even no. is  $2/3$  times chance of odd no. We flipped the die 5 times find probability odd no appear 3 times.

b) Die is weighted so that the even no. is  $2/3$  times chance of odd no.. If A: the no. is odd no. and B: the no. is prim no. Find  $P(A/B)$

c) Coin is weighted so that the head is 2 times chance of tail appears. We flipped the coin 4 times. X: no. of heads. Write the prob. Function.

**Question(4)**

a) If  $X = \{1, 2, 3\}$ ,  $E(x - \mu)^2 = 27/16$  and  $\mu = 7/4$  find  $E(x^3)$

b) Coin weighted so that the head is  $3/4$  times chance of tail appears. The coin flipped one time. If it is tail we flip another coin one time else we take ball from box contains 3 red balls and 12 green balls. Find probability that the ball is red

**Question(5)**

a) If  $f(x)$  is p.f. find  $c$ ,  $E(x)$  and  $v(x)$  where  $f(x) = c e^x$   $0 < x < 2$  and  $f(x) = 0$  else where

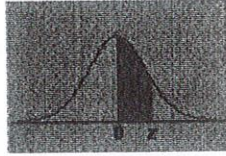
b) Consider a normal distribution with  $\mu = 50$  and  $\sigma = 15$ .

What is the probability that a measurement will be in the interval from 60 to 80



What is the probability that a measurement will exceed 70

*With my best wishes. Dr. Moanis Moaz*

Area between 0 and z



z	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0399	0.0439	0.0479	0.0517	0.0557	0.0599	0.0639	0.0679	0.0714	0.0753
0.2	0.0793	0.0833	0.0874	0.0910	0.0947	0.0987	0.1027	0.1064	0.1103	0.1144
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1629	0.1666	0.1700	0.1737	0.1774	0.1809	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2614	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2853
0.8	0.2884	0.2910	0.2930	0.2967	0.2995	0.3022	0.3054	0.3079	0.3100	0.3130
0.9	0.3159	0.3186	0.3212	0.3239	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3709	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3868	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4266	0.4279	0.4293	0.4308	0.4319
1.5	0.4333	0.4347	0.4357	0.4370	0.4382	0.4394	0.4406	0.4417	0.4427	0.4437
1.6	0.4447	0.4456	0.4465	0.4474	0.4483	0.4492	0.4501	0.4510	0.4519	0.4527
1.7	0.4535	0.4543	0.4551	0.4559	0.4567	0.4575	0.4583	0.4591	0.4599	0.4606
1.8	0.4613	0.4621	0.4629	0.4636	0.4643	0.4651	0.4658	0.4665	0.4672	0.4679
1.9	0.4686	0.4693	0.4699	0.4706	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744
2.0	0.4750	0.4756	0.4762	0.4768	0.4773	0.4779	0.4784	0.4789	0.4794	0.4799
2.1	0.4804	0.4809	0.4814	0.4819	0.4824	0.4828	0.4833	0.4838	0.4843	0.4847
2.2	0.4851	0.4856	0.4860	0.4864	0.4869	0.4873	0.4877	0.4881	0.4885	0.4889
2.3	0.4893	0.4897	0.4899	0.4904	0.4908	0.4912	0.4916	0.4919	0.4923	0.4927
2.4	0.4930	0.4934	0.4937	0.4940	0.4943	0.4946	0.4949	0.4952	0.4955	0.4958
2.5	0.4961	0.4964	0.4967	0.4970	0.4973	0.4976	0.4979	0.4981	0.4984	0.4987
2.6	0.4989	0.4991	0.4993	0.4995	0.4997	0.4999	0.5001	0.5002	0.5004	0.5005
2.7	0.4996	0.4998	0.4999	0.5000	0.5001	0.5002	0.5003	0.5004	0.5005	0.5006
2.8	0.4997	0.4998	0.4999	0.5000	0.5001	0.5002	0.5003	0.5004	0.5005	0.5006
2.9	0.4997	0.4998	0.4999	0.5000	0.5001	0.5002	0.5003	0.5004	0.5005	0.5006
3.0	0.4997	0.4998	0.4999	0.5000	0.5001	0.5002	0.5003	0.5004	0.5005	0.5006

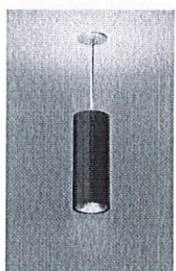
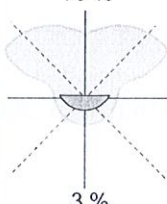
	Port Said University Faculty of Engineering Department of Architecture and Urban Planning					
	Program/year:	Architecture 2020/21	Semester:	Second		
	Course title:	Lighting and Acoustics of buildings	Course code:	ARC217		
Date:	23-06-2021	Total assessment marks:	45	Time allowed:	3 hours	Fresh

The student is allowed to use B.R.S protractor  
 The student has to be accurate in drawing & measurements  
 Exam is in 1 paper, double face, 4 Questions.

Question (3): [8 marks]

ILOs: B2.2, B2.3, B3.2

Design the general lighting for a dining hall in a restaurant knowing that its dimensions are 4.5 x 6 m with a ceiling height of 3.5 m, using lamp No. 7 from tables. The luminous flux of the lamp is 3020 lumen, and the lamp is suspended 0.5 meter from the ceiling. The required level of illumination is 40 Ft-c and the maintenance factor is expected to be medium. The height of tables is 1.0 meter. The reflection factor of the ceiling is 50 % and that of walls is 10%.

Luminaire	Distribution	Spacing & maintenance factor	Ceiling	75 %			50 %			30 %	
			Walls	50%	30%	10%	50%	30%	10%	30%	10%
			Room index	Coefficient of Utilization							
 7.	 79 % 3 %	Not to be exceed 1.2 X C.H  M.F G → 0.70 M → 0.60 P → 0.50	0.6	0.16	0.13	0.11	0.12	0.10	0.08	0.06	0.05
			0.8	0.20	0.16	0.15	0.15	0.13	0.11	0.08	0.07
			1.0	0.23	0.20	0.17	0.17	0.14	0.13	0.10	0.08
			1.25	0.26	0.23	0.20	0.20	0.17	0.15	0.11	0.10
			1.5	0.29	0.26	0.22	0.22	0.19	0.17	0.12	0.11
			2.0	0.32	0.29	0.26	0.24	0.21	0.19	0.13	0.12
			2.5	0.26	0.32	0.30	0.26	0.24	0.22	0.15	0.14
			3.0	0.38	0.35	0.32	0.28	0.25	0.24	0.16	0.15
			4.0	0.42	0.39	0.36	0.30	0.29	0.37	0.18	0.17
			5.0	0.44	0.41	0.39	0.33	0.30	0.29	0.19	0.18



Question (4): [8 marks]

ILOs: B2.2, B2.3, B3.2

Design your classroom with regard to acoustics knowing that its dimensions are 7 x 14 m with a ceiling height of 3.5 m and it has one window with dimensions 7, 1.5 m and one door with dimensions 1.2, 2.5 m. The sound absorption coefficient for various materials at different frequencies is shown in the table below.

Materials		125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Wall Materials	Fibreboard on solid backing - painted	0.05	0.00	0.10	0.00	0.15	0.15
	Plasterboard on frame, 100mm airspace	0.30	0.12	0.08	0.06	0.06	0.05
	5mm plywood on battens, 50mm airspace filled	0.40	0.35	0.20	0.15	0.05	0.05
	Wood: 3/8" plywood panel	0.28	0.22	0.17	0.09	0.10	0.11
Floor Materials	Carpet, thin, over thin felt on concrete	0.10	0.15	0.25	0.30	0.30	0.30
	Carpet, needlepunch	0.03	0.05	0.05	0.25	0.35	0.50
	carpet on concrete	0.02	0.06	0.14	0.37	0.60	0.65
	Wood parquet on concrete	0.04	0.04	0.07	0.06	0.06	0.07
	linoleum/vinyl tile on concrete	0.02	0.03	0.03	0.03	0.03	0.02
Ceiling Materials	Acoustic Ceiling Tiles	0.70	0.66	0.72	0.92	0.88	0.75
	Sheetrock 1/2" 16" on center	0.29	0.10	0.05	0.04	0.07	0.09
	Plasterboard 10mm, backed with 25mm bitumen	0.30	0.20	0.15	0.05	0.05	0.05
	Perforated metal tiles backed with 25mm thick resin	0.10	0.30	0.60	0.75	0.80	0.80
Doors	Acoustic door, steel frame, double seals, & absorbent	0.35	0.39	0.44	0.49	0.54	0.57
	3-4mm plywood, 75mm cavity containing mineral wool	0.50	0.30	0.10	0.05	0.05	0.05
Window	Ordinary window	0.35	0.25	0.18	0.12	0.07	0.04
	Large panes of heavy plate glass	0.18	0.06	0.04	0.03	0.02	0.02
	Double glazing, 2-3mm glass, 10mm air gap	0.15	0.05	0.03	0.03	0.02	0.02



	Port Said University Faculty of Engineering Department of Architecture and Urban Planning			
	Program/year:	Architecture 2020/21	Semester:	
Course title:	Lighting and Acoustics of buildings	Course code:	ARC217	
Date:	23-06-2021	Total assessment marks:	45	Time allowed: 3 hours
Fresh				

The student is allowed to use B.R.S protractor  
 The student has to be accurate in drawing & measurements  
 Exam is in 1 paper, double face, 4 Questions.

Answer all the following questions:

Question (1): [12 marks] ILOs: A4.2, A5.1, A2.2

- 1) **Clarify** the behavior of sound waves with regard to types of surfaces ..... (3 marks)
- 2) **Compare** between two types of sound absorbing materials (organize your answer in a table).... (4 marks)
- 3) **Define** the following: SHGC, SAD, Rotunda effect, Flutter echo, Heliostat (use sketches) ..... (5 marks)

Question (2): [17 marks] ILOs: B2.2, B2.3, B3.2

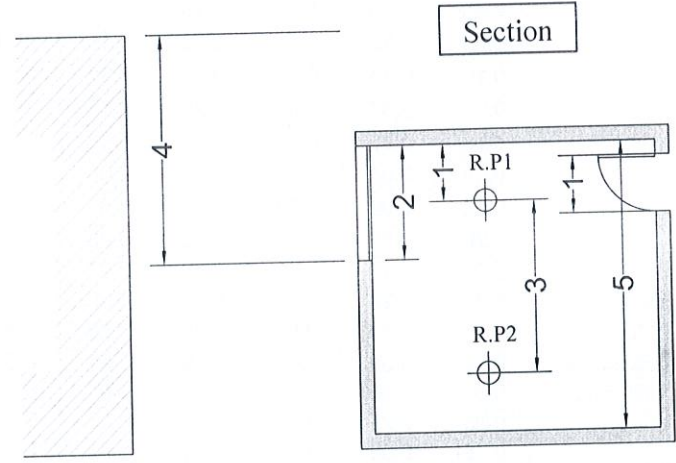
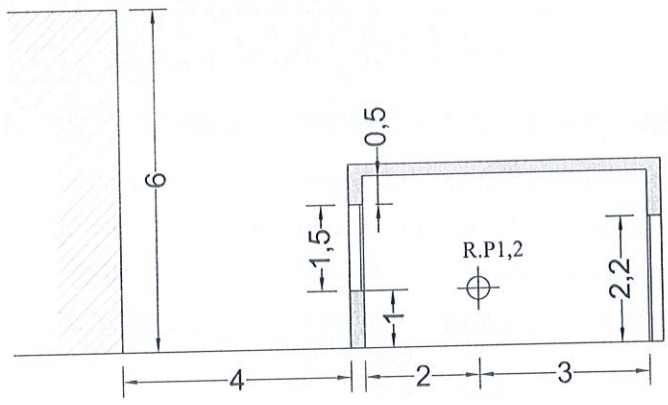
For the given room, **calculate** the Daylight Factor at the two reference points:  $Rp_{(1)}$  and  $Rp_{(2)}$  knowing that the reflection factors are as follows:

Ceiling 80 %, Floor 45 %, Walls 55 %, Window 15%, and Door 50 %.



**Draw** the elevations of window for every point.

**Explain** the results of DF at both points.

Giving that the standard level of DF at these points is 2%, **suggest** a solution (with sketches).



Angle of obstruction	(C)
0	C = 39
10	C = 35
20	C = 31
30	C = 25
40	C = 20
50	C = 14
60	C = 10
70	C = 7
80	C = 5

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF CHEMICAL ENGINEERING</b>				
	PROGRAM/YEAR	CHEMICAL ENGINEERING, 2020-21	SEMESTER	SECOND	
DATE:	23 - 6 - 2021	COURSE TITLE:	PHYSICAL UNIT OPERATIONS	COURSE CODE	CHE 206
		TOTAL ASSESSMENT MARKS	75	TIME ALLOWED	3 HOURS
					FRESH

Answer The Following Questions, Assume Any Missing Data.

Clear and Arranged Answer Is Required, All calculated values must be associated with correct units.

**Question One:** ..... (15 Points)

Write false (X) or right (√) --- (5 Points)

1. Screening is a recommended method for analyzing of particulate solids when  $dp < 50 \mu m$ .
2. Separation of particulate solids through moving fluids is more efficient when density of lighter particles greater than density of working fluid.
3. Screening efficiency as well as power consumption increase with time of screening.
4. In screens, when the diameter of opens decreases, mesh number increase.
5. In Spitzkasten or hydrosizer, upward velocity of carrier fluid increases from first unit to the last one.
6. Drying in batch mode is preferred than the continuous mode for low production rate.
7. Air humid volume has a direct proportion with air temperature in contrast with its pressure.
8. The rate of drying increases with time in the falling rate period.
9. Rate of drying in early stages (constant rate period) not depends on nature of the materials.
10. In tunnel dryer, drying with a co-current pattern is favorable when the material is sensitive for temperature.
11. Tray or shelf dryers are commonly used for particulate solids.
12. Utilities and labor costs for processes operated in a batch mode are greater than processes operated in a continuous mode.
13. For crushing system operated with a low rate of feeding, efficiency as well as power consumption is low compared with other type of feeding.
14. The power consumption for dry grinding is low compared with the wet grinding.
15. Crushing is mainly due to compression and attrition mechanisms in Gyratory crushers.

**Question Two:** ..... (25 Points)

1. Explain with mathematical equations when required, how particle size is determine for the following: Single irregular particle and coarse particulate system.
2. The following Table represents the screen analysis for course particulate mixture; find the mean particle size for this mixture.

Screen open $d_p$ , mm	4.69	3.32	2.36	1.65	1.17	0.83	0.58	0.29	0.0
Mass fraction retained, $x_i$	0.000	0.025	0.124	0.321	0.257	0.161	0.075	0.022	0.015

3. Consider data presented in the above Table is obtained for a fine particulate system (fin powder). Calculate both volume mean diameter and mean volume diameter.

**Question Three:** ..... (20 Points)



1. List three reasons for carrying out size reduction.
2. There are different basic patterns affected by the application of force for size reduction, discuss?
3. Grinding may be carried out either wet or dry, what are advantages of wet grinding?
4. Discuss in details with a sketch for only one crushing unit (select a crusher).

**Question Four :** ..... (15 Points)

1. Define the following:  
Humidity, relative humidity, and the humid heat
2. Write short notes with a sketch for a tunnel dryer.
3. A 100 kg batch of granular solids containing 30 percent moisture is to be dried in a tray drier to 20 percent of moisture by passing a current of air at 350 K tangentially across its surface at a velocity of 1.8 m/s. If the constant rate of drying under these conditions is  $0.0007 \text{ kg/s m}^2$  and the critical moisture content is 15 percent, calculate the approximate drying time. Assume the drying surface to be  $0.03 \text{ m}^2/\text{kg dry mass}$ .

---

*With my best wishes*  
*Prof. Dr. Eng./Taha I. Farrag*

	<b>PORT SAID UNIVERSITY</b> FACULTY OF ENGINEERING-Chemistry Engineering Department					
	Program/ Year	2020-2021	Semester	Second		
COURSE TITLE:	Engineering Metallurgy and materials	COURSE CODE	PRD 226			
<b>DATE:</b>	26 JUNE 2021	<b>TOTAL ASSESSMENT MARKS:</b>	75	<b>TIME ALLOWED:</b>	3 HOURS	FRISH

**ANSWER THE FOLLOWING QUESTIONS**

**QUESTION (1)**

**(a3-1a3-2, a8-1, b2-1)**

1.1- A portion phase diagram of Ni-Ti shown in Fig. P1, identify the names of reaction 1, 2, and 3. Specify their locations temperature, and composition.

1.2- For alloy 30 wt.%Ti, make schematic sketches of the microstructure that would be observed and cooling curve for conditions very slow cooling from 1400°C to room temperature. **(5 Marks)**

**QUESTION (2)**

**(a3-2, a8-1, b2-1)**

2.1- Explain and draw a steel heat treatments cycle of the following,

a) Annealing

b) Normalizing

c) Quenching

2.2- Using Fe-Fe<sub>3</sub>C phase diagram of Fig. P 2, to explain a different reactions and phases on the diagram.

2.3- Consider a 1060 steel at temperature 725 °C:

(a) What phases are present? (b) What is the chemical composition of each phase?

(c)- What percentage of each phase is present?

2.4- Draw and describe the structural changes when 1060 plain carbon steel slowly cooled from the liquid region to room temperature.

2.5-Explain the quenching and tempering heat treatments of 1060 carbon steel.

**(15 Marks)**

**QUESTION (3)**

(b2-1, b17-3, c16-1, d1-2, a10-1, a3-1, d9-1)

3.1- Sketch an engineering stress-strain curve of ductile and brittle metals, and identify all significant regions and points between them. Assume that loading continues through fracture. (5 Marks)

3.2 A tensile specimen with a 12 mm initial diameter and 50 mm gage length reaches maximum load at 90 KN. The minimum diameter at fracture is 10 mm. Determine the engineering stress at maximum load ( $\sigma_{ut}$ ), the true fracture stress and true strain at fracture. (15 Marks)

---

**QUESTION (4)**

(b2-1, b17-3, c16-1, d1-2, a10-1, a3-1, d9-1)

4.1- Describe and Sketch the following terms:

- a) Hardness- Toughness- Transition temperature (high carbon steels and stainless steels).  
b) Viker's hardness test,                      c) Izod,s Impact test. (10Marks)

4.2- A cylindrical specimen of steel having an original diameter of 12.8 mm is tensile tested to fracture and found to have an engineering fracture stress of 460 Mpa. If its cross-sectional diameter at fracture is 10.7 mm, determine the following;

- (a) The ductility in terms of percent reduction in area (%RA).  
(b) The true stress at fracture ( $\sigma_T$ ). (10 Marks)
- 

**QUESTION (5)**

(a3-1, , c17-1, , d1-1, d9-, 1d9-3)

5.1- What are the classification of polymers, characteristics and applications?

5.2- What are advantages and disadvantages of composites materials?



5.3- What are the manufacturing processes of ceramics and applications?

5.4-What are types of corrosion and corrosion protection for steel?

(15 Marks)

---

*Wishing the best of luck for all of you*

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF ELECTRICAL ENGINEERING</b>				
	Program/ Year	(Electrical Power)2 <sup>nd</sup> year 2020-21	Semester	Second	
COURSE TITLE:	Energy Conversion	COURSE CODE:	EPM210		
DATE:	26/6/2021	TOTAL ASSESSMENT MARKS:	70	TIME ALLOWED:	3 HOURS
					FRESH
	Electron charge	$1.6 \times 10^{-19} \text{ C}$	MW of gas	$28.97 \text{ g/mol}$	
	Boltzmann's constant	$1.385 \times 10^{-23} \text{ JK}^{-1}$	Gas constant	$8.2056 \times 10^{-5}$	

**Question # 1 [ILO A2.1 A10.1 B3.1]**

**[20 marks (5, 5, 10)]**

[A] Select the best answer.

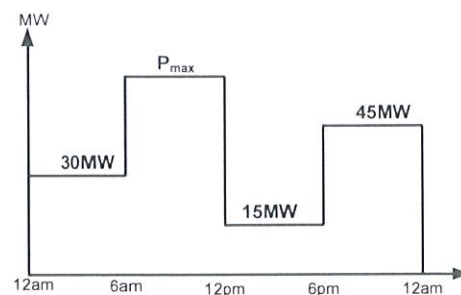
- 1- Natural uranium contains 99.2 % of [uranium 238, uranium 235, uranium 234]
- 2- The gas power station has [slow, fast] rate of starting.
- 3- Solar cell negative terminal is [top electrical grid, back metal contact, ARC].
- 4- The fill factor decreases as the series resistance [increases, decreases].
- 5- Solar cell grid fingers resistance is represented by [shunt, series] resistance.

[B] Decide true or false, write the correct statement for the wrong ones.

- 1- AM0 means that the sun directly overhead.
- 2- Hydraulic Power Station has high cost per kWh.
- 3- Proton released by nuclear fission normally move very fast.
- 4- Positive terminal of solar cell is top electrical grid.
- 5- Peak sun is measured in hours.

[C] A coal fired thermal power station has an overall efficiency of 25 %. The station supplies the given load as shown in next figure. The coal consumption from 12am to 12pm is 135 ton. If the coal burnt has a calorific value of 57600 kJ/Kg and about 80% of the fuel is carbon.

- 1- Find the coal consumption per kWh.
- 2- Find the maximum value of the load curve ( $P_{max}$ )
- 3- Find The coal consumption per day
- 4- Find the emission rate of carbon (kgC/day) and carbon dioxide (kgCO<sub>2</sub>/day).



**Question # 2 [ILO A1.1 A10.1 B3.1]**

**[25 marks (5, 5, 5, 10)]**

[A] Define - Air mass - Peak sun hours - Heat rate - Band gap energy

[B] Draw simple diagram to illustrate the solar cell construction, also draw PV characteristics.

[C] What is the power output of a  $U^{235}$  reactor if it take 15 days to use up 1 kg of fuel? The fission of a  $U^{235}$  nucleus yields about 200MeV.

[D] A hydro-electric power station has a reservoir of area 2.5 square kilometres and capacity  $5 \times 10^6 \text{ m}^3$ . The effective head of water is 100 m. The penstock, turbine and generation efficiencies are respectively 95% , 90% and 85%.

Calculate the total electrical energy that can be generated from the power station.

If a load 15000 kW has been supplied for 5 hours, find the fall in reservoir level.

**Question # 3 [ILO A1.1 A2.1 B1.1 ]**

**[25 marks (9, 9, 7)]**

[A] A PV module is made up of 36 identical cell, all wired in series. Each cell has an area of  $0.017 \text{ m}^2$ . With 0.8-sun insolation, each cell has short-circuit current 5.12A and at  $25^\circ\text{C}$  its reverse saturation current is  $4 \times 10^{-11} \text{ A}$ . Parallel resistance  $R_p=10 \Omega$ . Find

- Open-circuit voltage of the module.
- The load voltage, current and power when the junction voltage of each cell is  $V=0.58 \text{ V}$
- Efficiency of the module under the load condition above

[B] A load of 1.5kW at 120 volt, it is required to supply this load by PV system. Use the data given in next table to determine the following;

- Number of modules for each PV type, surface area, and the cost.
- Which type is more expensive, for your design? Calculate the oversize for each type
- Find the actual voltage and current of PV system, for your design



	Power, W	Voltage, V	Current, A	Efficiency	Cost(\$)	Area( $\text{m}^2$ )
Type 1	200	40	5	16.4%	90	1
Type 2	180	30	6	13.1%	70	1.25

[C] Write short notes about one of the following topics. Illustrate your answer with drawing.

- a- Electric vehicles    b- Energy storage systems    c- Ocean energy    d- Smart grid

*Best Wishes*

*Dr. M. Hegazy*

	<b>PORT SAID UNIVERSITY</b> <b>FACULTY OF ENGINEERING</b> <b>DEPARTMENT OF MECHANICAL POWER ENGINEERING</b>					
	PROGRAM/YEAR	(MECHANICAL POWER ENGINEERING) (2020 – 2021)	SEMESTER	SECOND		
COURSE TITLE:	COMBUSTION TECHNOLOGY	COURSE CODE:	MPE214			
DATE:	26-6-2021	TOTAL ASSESSMENT MARKS	75	TIME ALLOWED:	3 HOURS	FRESH

**Answer all the following questions (The exam is four questions)**

**Question No. One [23 Marks]**

**LOs (A3.1, A4.1, B1.1, C1.1, C4.1)**

- (a)- Define the followings: Flame, excess air factor, complete combustion, and the heating value of a fuel. **[4 Marks]**
- (b)- Explain with drawing the effect of initial droplet diameter on the droplet lifetime. **[3 Marks]**
- (c)- What are the main fuel injector requirements? **[4 Marks]**
- (d)- Explain the different energy losses in combustion systems. **[5 Marks]**
- (e)- Gaseous methane is burned in air with 20 % excess air at constant pressure in a steady flow process at pressure and temperature of 1 bar and 25 °C, respectively. Calculate the heat released if the products temperature is equal 1400 K. Also calculate the heat released at exhaust temperature of 1250 K. Comment the results. **[7 Marks]**

**Question No. Two [20 Marks]**

**LOs (A3.1, A4.1, B1.1, B3.1, C2.1, C3.1)**

- (a)- Write down the chemical reaction equations for complete combustion of a hydrocarbon fuel ( $C_\alpha H_\beta$ ) in a surrounding air and in pure oxygen. **[3 Marks]**
- (b)- Explain with drawing the main components of the gas turbine power station. **[3 Marks]**
- (c)- Explain with drawing the effect of the temperature on fuel surface tension. **[3 Marks]**
- (d)- Illustrate a detailed comparison between the premixed and diffusion flames. **[4 Marks]**
- (e)- Estimate the visible flame length ratio of  $C_3H_8$  for  $\lambda = 1.5$ . Assuming the average heat value of the fuel of 42 MJ/kg and specific heat of products of 1.05 kJ/kg-K and the initial temperature of fuel and air equals 30 °C. **[7 Marks]**



**Question No. Three [16 Marks]**

**LOs (A3.1, A4.1, B1.1, C1.1, C2.1, C3.1, C4.1)**

- (a)- Write down the reaction equation of hydrocarbon fuel  $C_8H_{18}$  for complete combustion in oxygen without dissociation and with dissociation (Assume  $CO_2$  dissociated into  $CO$  and  $O_2$  and  $H_2O$  dissociated into  $H_2$  and  $O_2$ ). **[3 Marks]**
- (b)- Explain in detail the effect of the equivalence ratio on the flame length ratio. **[4 Marks]**
- (c)- What are the different spray applications? **[3 Marks]**
- (d)- For boiler firing system of heavy oil fuel, the flue gas temperature is  $310^\circ C$ , the ambient temperature is  $30^\circ C$  and oxygen content is 4.5% by volume on dry basis. If the radiation with blowdown losses equal 6.5%, find the boiler efficiency, carbon dioxide concentration and the excess air factor. **[6 Marks]**

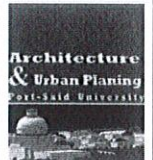
**Question No. Four [16 Marks]**

**LOs (A3.1, A4.1, B1.1, B3.1, C1.1)**

- (a)- Explain the main applications of premixed and diffusion flames. **[4 Marks]**
- (b)- What are the main types of atomizers? **[3 Marks]**
- (c)- Explain with drawing the main combustor types. **[6 Marks]**
- (d)- Calculate the volume of air required for complete combustion of methane per kg and per kmol of fuel. The air is supplied at 0.98 bar and  $25^\circ C$ . **[3 Marks]**



Port Said University  
Faculty of Engineering  
Department of Architecture and Urban Planning



PROGRAM/YEAR:	Architecture 2020/2021 SECOND YEAR	SEMESTER	SECOND			
COURSE TITLE:	التخطيط العمراني والبيئي (1)	COURSE CODE:	UPL 202			
DATE:	26-06-2021	TOTAL ASSESSMENT MARKS:	45	TIME ALLOWED:	3 HOURS	FRESH

أجب عن جميع الأسئلة التالية مستعينا بالاسكتشات كلما امكن  
(الإجابة بالقلم الجاف ويسمح بالقلم الرصاص للاسكتشات فقط)

LOs: A2, B4

السؤال الاول (9 درجات):

اشرح مكونات التخطيط البيئي ، واهم مقوماته.

LOs: A10, B4

السؤال الثاني (9 درجات):

اشرح كيف تؤثر قوى تغير ملامح وخصائص الناس على البيئة العمرانية.

LOs: A10, B4, C1

السؤال الثالث (12 درجة):

- حدد المشكلات، المحددات، الامكانيات للوضع العمرانية الآتية:  
أ. عمارة سكنية حديثة بارتفاع 12 دور يحيط بها مباني متوسطة الارتفاع (3-5 ادوار).  
ب. مباني متدهورة بارتفاع دورين.
- وضح كيف يمكن ان تكون العناصر التالية مشكلة و محدد و امكانية في نفس الوقت:  
أ. مبنى اداري.  
ب. كوبري مشاه.

LOs: A2, C1, C2

السؤال الرابع (15 درجة):

- تتضمن عملية اعداد البدائل التصميمية عدة محاور، اشرحها.
- حدد محاور مصفوفة الاهداف لتطوير المناطق التالية:  
أ. منطقة ذات مستوى اقتصادى منخفض وينقصها العديد خدمات.  
ب. منطقة سكنية ذات شوارع ضيقة.

.....انتهت الاسئلة.....

د. هبه عادل احمد

مع اطيب التمنيات بالنجاح والتوفيق