
	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF MECHANICAL POWER ENGINEERING					
	PROGRAM/ YEAR	(MECHANICAL POWER ENGINEERING)	SEMESTER		SECOND	
	COURSE TITLE:	POLLUTION FROM VEHICLES (ELECTIVE COURSE 6)	COURSE CODE:		MEP458	
DATE:	11- 6 - 2016	TOTAL ASSESSMENT MARKS:	70	TIME ALLOWED:	3 HOURS	FRESH

Answer the following questions

QUESTION (1) (15marks)

- Define CFCs, and what is their danger?
- Compare between relative emissions emitted from CI and SI engines.
- What is pollution and why carbon monoxide is considered a pollutant?
- What is the Ecosystem? What are the components of ecosystem? Give examples.
- Define: particulate matter, dehydrogenation, polymerization and agglomeration.

QUESTION (2) (15 marks)

- What are types of vehicles emissions? Describe the evaporative emissions.
- Define: Sound, Noise, Frequency, and Intensity of sound.
- What is the effect of engine load on CO₂, CO, UHC and NO_x for gasoline engine?
- What is the muffler and how does it work?
- How to Control noise in vehicle?

QUESTION (3) (15 marks)

- Describe the operation of PCV (Positive Crankcase Ventilation System).
- Explain the different sources of noise?
- What are reasons of exhaust noise on vehicles?
- Explain the Tailpipe emissions.
- "Acid rain is considered as a big environmental problem", explain this statement showing the acid rain formation and its effects.

QUESTION (4) (15 marks)

- Describe EGR control system of emissions.
- "Gas chromatography is one of the most widely used methods to determine the chemical make-up of a complex, volatile mixture" comment.
- Mention the different types of NO_x and discuss thermal NO_x formation mechanism.
- What is noise Measurement Instrument?
- Discuss the effect of biodiesel and engine load on NO_x emission.



QUESTION (5) (10 marks)

- Explain in details, how to measure the mole fractions of the combustion products (Using Orsat Apparatus)?
- An operator reports the following raw volume measurements on an Orsat device in measuring the combustion products for methane fuel (CH₄). Based on these data, calculate the excess air factor:

Initial sample	: 100 cm ³	After CO ₂	: 86 cm ³
After O ₂	: 82 cm ³	After CO	: 80 cm ³

Good Luck

Dr. Eng. Ibrahim Abdel-Rahman Ibrahim

						
	PROGRAM/ YEAR	(ELECTRICAL POWER & MACHINES) 2015-16	SEMESTER		CONTIN.	
	COURSE TITLE:	Electrical Testing II	COURSE CODE:		EPM426	
DATE:	31-5-2016	TOTAL ASSESSMENT MARKS:	100	TIME ALLOWED:	2 HOURS	FRESH

Attempt all the following questions:

Power System Lab.:

1. Draw and Explain the following lab experiment:
 - Over current protection.
 - Three phase power factor improvement.
2. Fully discuss with drawing the following protection types:
 - Distance protection.
 - Differential protection.
 - Over / Under frequency protection.

Electrical Machine Lab.:

1. (a) Discuss the principle of operation of three phase induction motor.

(b) Discuss experimentally with drawing the connection diagram how to use capacitor bank with three phase induction machine to improve the power factor.
2. (a) Explain the principle of operation of synchronous generator.

(b) Discuss experimentally with drawing the connection diagram how to synchronize a three phase synchronous generator with the utility grid.

High Voltage Lab:

1. Explain with drawing, experimentally the measurement of high voltage (AC) by two spheres.
2. (a) Define earthing process and explain the meaning of earth resistance and how should it differ with the size of electrical system.

(b) How to deal with two high earth resistance.

(c) Explain the earth shells around earth electrode.

(d) What is the soil resistivity and explain experientially how to measure it.

(e) Define the partial discharge and explain the process of discharge in voids.

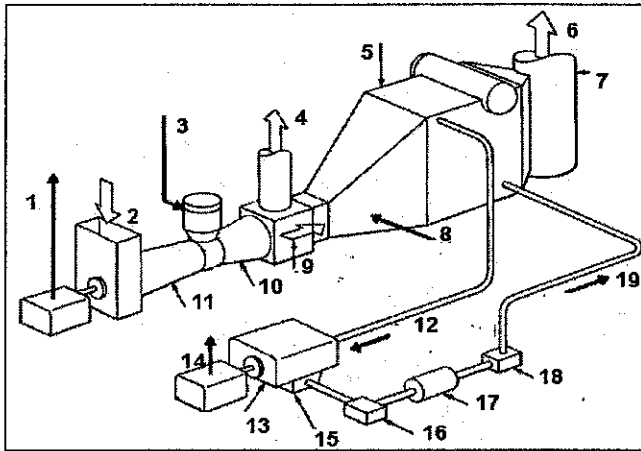


Fig. III-2

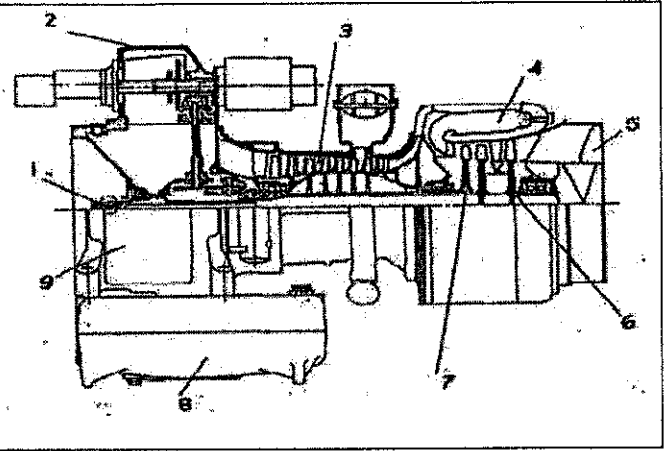


Fig. III-3

[9 Mark]

III.(B) What are the main objectives of the following: - Partial admission control of steam turbines – Velocity compounding of steam turbines – Moderator in nuclear reactors – Steam injection in gas turbine plants – Air swirler in atomizer. [5 Mark]

III.(C) What are the sources of exergy losses in combined-cycle power plants? [8 Mark]

IV. (A) In large steam power plants the first stage of the turbine is usually velocity compounded. Sketch the dimensionless velocity triangles of such stage with two-moving rows using the following data: axial stage with constant flow coefficient from inlet to exit of 0.85, whirlless inlet and exit absolute velocity of steam to the stage, and zero degree of reaction [5 Mark]

IV. (B) For the above stage sketch the expansion process on (T-s)-diagram and calculate the stage enthalpy coefficient and the internal power developed, if the mean blade velocity is 220 m/s and the steam mass flow rate is 100 kg/s. [3 Mark]

IV. (C) On the above (T-s)-diagram of the velocity compounded stage indicate the areas corresponding to the specific exergy losses in each blade row. [2 Mark]

V. Figure 5 shows the arrangement of a combined plant with helium-cooled nuclear reactor. The mass flow rate of He compressed is 200 kg/s. Water mass flow rate for LP-drum is 20 % of the total. Compressor and GT polytropic efficiency is 0.92. Condenser pressure is 0.07 bar. All other necessary data are given in the figure. Assume straight line expansion in (h-s)-diagram for both portions of the steam turbine, neglect the works of the pumps, all mechanical and generator losses and calculate: 1. The mass flow rate of steam generated from HP- and LP-sections. 2. The net power of the steam turbine generator. 3. The net power of the gas turbine generator. 4. The overall thermal efficiency of the combined plant. 5. Draw a rough sketch for the (T-Q)-diagram of the steam generator indicating the different heating sections. [20 Mark]

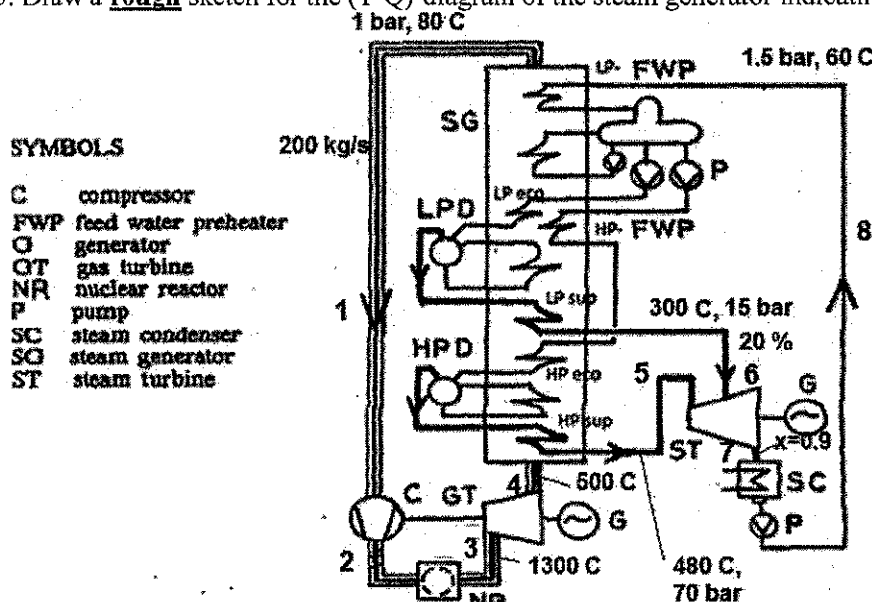




Fig. 5: Combined cycle with helium-cooled NR & dual pressure boiler

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF MECHANICAL POWER ENGINEERING					
	YEAR:	4 TH MECHANICAL POWER - 2015-16	SEMESTER:	SECOND		
	COURSE TITLE:	THERMAL POWER PLANTS	COURSE CODE:	MEP408		
DATE	MAY 2016	TOTAL ASSESSMENT MARKS	100	FIVE ALLOWED	3 HOURS	&FRESH RESET

Make any necessary assumptions. Use of steam tables & chart is allowed. The maximum mark is 100. Take cp for helium 5.2 kJ/kgK and R=2.07 kJ/kgK. For water cp = 4.18 kJ/kgK and $\rho = 1000 \text{ kg/m}^3$.

I. Answer with Yes or No giving the reasons:

1. Regeneration and reheating in steam power cycle does not affect the boiler exergy losses.
2. Main exergy losses in boiler are due to exhaust gas losses.
3. Use of split-shaft gas turbine is to increase the turbine power.
4. Compressor working range affects the gas turbine power plant operating range.
5. Reheating is mainly to increase the turbine work.
6. Boiling water nuclear reactor is capable to meet sudden load changes.
7. Nuclear power plants are essential for Egypt, in spite of exploring a large number of natural gas fields.
8. Graphite is used as moderator in water cooled nuclear reactors.
9. Solid coal can never be used in open-cycle gas turbine power plants.
10. Superheated steam cannot be generated in water-cooled nuclear reactor plants.
11. Steam temperature at turbine inlet is increased with increased load.
12. For a steam turbine driving a ship there is no need for a speed governor.
13. The shape of steam turbine designed for nuclear plant differs than that for fossil-fuel-fired steam plant.
14. It is recommended to run the open-cycle gas turbine at its full rated power.
15. At part load operation of gas turbine plant the compressor pressure ratio is independent of the fuel mass flow rate.
16. Turbine blade cooling increases the thermal efficiency of gas turbine plant.
17. Regeneration in gas turbine cycle is more effective for lower compressor pressure ratio.
18. Selection of the type and the size of power generating units has nothing to do with the load curve of the electric power system.
19. The peak diversity factor of a group of consumers is always greater than one.
20. Sliding pressure control enables meeting sudden load change in steam power plants. [30 Mark]

II. (A) Sketch the arrangements of the following thermal power plants, naming each component:

- i- Combined plant with fluidized bed firing system.
- ii- Solar-assisted thermal power plant.
- iii- Geothermal co-generation plant with flash evaporation and central heating system.
- iv- Nuclear steam power plant with liquid-metal-cooled reactor.

[12 Mark]

II. (B) State briefly the main advantages of combined Rankine-Kalina power plants.

[3 Mark]

II. (C) Explain with aid of sketches the method of load control for each of the following plants:

- i- Closed-cycle gas turbine power plant.
- ii- Steam power plant using modified sliding pressure control.
- iii- Boiling water reactor nuclear power plant.

[9 Mark]

III. (A) Write the name and the type of the following and the elements names of each:

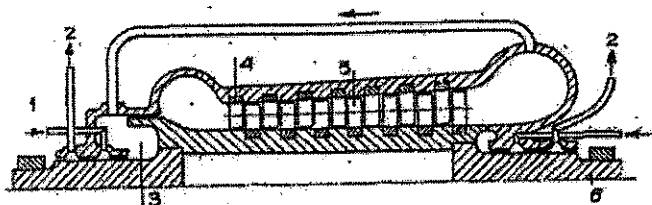
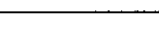


Fig. III-1

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING					
	PROGRAM/ YEAR	ELECTRONIC & COMMUNICATION	SEMESTER		SECOND	
	COURSE TITLE:	MOBILE COMMUNICATIONSSYSTEMS	COURSE CODE:		ECE- 464	
DATE:	4-6- 2016	TOTAL ASSESSMENT MARKS:	70	TIME ALLOWED:	3 HOURS	FRESH AND RESET

QUESTION (1): (26 marks)

1. Complete the following sentences (6marks)
 - a) GPRS upgrades the GSM system by using new which is compatible with ... for voice call
 - b) GPRS upgrades the GSM system by new software for and new software and hardware for.....
 - c)stores the centralized database butstores a temporary location for subscription
 - d) Mobile systems use..... (full-duplex, half-duplex, simplex) channel which is..... (one-way channel, two-way on two separate channels, two-way on the same channel)
 - e) FM radio and television systems use..... (full-duplex, half-duplex, simplex) channel which is (one-way channel, two-way on two separate channels, two-way on the same channel)
2. What are the main differences between GSM and GPRS? Mention briefly the new added blocks to GSM architecture to support data rate applications. (4 marks)
3. Draw the GSM physical layer and Mention briefly the function of each block? (7 marks)
4. Give the reasons for the following sentences (3marks)
 - a. AUC are used in GSM architecture.
 - b. Transcoder is used in GSM and IS-95
5. What is the Criteria for Handover (3 marks)
6. Define (3 marks)
 - Co channel cells
 - Logic channel
 - Paging channel

question (2) : (20 marks)

1. Draw the IS-95 Uplink transmission from the base station to mobile station (4marks)
2. What is the difference between scrambling and spreading? (2 marks)
3. Write the Properties of CDMA. (4 marks)
4. What is the difference between Walsh CODE and OVSF. (4 marks)

5. Explain the following effects in Cellular Mobile Communication and how can you Reduce their effect? (6 marks)

- i. Rician fading,
- ii. Rayleigh fading
- iii. adjacent-channel interference

Question (3): (13 marks)

1. What are the main differences between GSM and UMTS? Mention briefly the new added blocks to the GSM architecture to support 3G. Explain briefly the function of each of them (4 marks)

2. Briefly, explain How wide code division multiple access technique used in UMTS (4 marks)

3. True or false and correct the false sentences (3 marks)

- a. Duplexing methods in UMTS are FDM and TDM
- b. Maximum data rate for walk speed environment in 3G is 384kbps
- c. The multiple access technique used in UMTS is CDMA

4. Complete the following sentences: (2 marks)

- a. The solution of time delay is..... and to overcome the time dispersion we use
- b. The frequencies used in UMTS Downlink are..... and uplink frequencies are.....

Question (4): (11marks)

1. Give the reasons for the following sentences (9 marks)


- a- The randomizer, Reed Solomon encoder and puncture are used in WiMAX.
- b- WiMAX technology supports data rates up to 70 Mbps.
- c- Scalability is one of the features of WiMAX.
- d- Using OFDM in WiMAX
- e- Using TDD and FDD in WiMAX.
- f- IEEE 802.16d is published and replaced IEEE 802.16a and IEEE 802.16c
- g- WiMAX defined by Worldwide Interoperability for Microwave Access.

2. Complete the following sentences (2marks)

- a. WiMAX is the trade name of the
- b. Fixed WiMAX covers frequency band between and, Its lower frequencies make can use

Good Luck

Dr. HebaAbd el Atty

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING				
	PROGRAM/ YEAR	(COMMUNICATIOENGINEERING) 2015- 2016	SEMESTER	SECOND	
	COURSE TITLE:	COMMUNICATIONS AND CONTROL LAB.	COURSE CODE:	ECE421	
DATE:	JUNE. 2016	TOTAL ASSESSMENT MARKS:	90	TIME ALLOWED:	2 HOUR FRESH

Question (1): (35 marks)

- State the differences between TEM mode lines and Non TEM mode lines. Give two examples for each of them.
- Draw a graph for a terminated transmission line showing the load, the forward wave and the backward wave. Then write the formulas of total voltage, total current and impedance at any cross- section.
- What is meant by the normalized impedance?
- What is the difference between the magnitude of the reflection coefficient near the load and near the source?
- Prove that the distance between two successive current minimas equal $\lambda/2$.
- Complete: in a lossless transmission line
 - The current maxima occur at the same cross sections of theminima.
 - The distance between a voltage maximum and an adjacent voltage minimum is.....
- What is the relation between VSWR and the reflection coefficient?



Question (2): (35 marks)

- Calculate the normalized load impedance from the following measured data:
 VSWR = 3.5
 dmin= 7 mm
 Distance between two successive minima = 20 mm
- Give reasons for the use of SMITH chart?
- Find the load impedance (analytically and graphically)if the following data were measured :
 I_{max} = 90 μ A I_{min} = 15 μ A L₁= 75 mm , L₂= 68 mm
 Distance between two successive minima = 39 mm
- ☐ Design a single shunt stub to match this impedance to the line.
- Draw the system used to measure an unknown impedance.

Question (3): (20 marks)

- State some of the drawbacks of Antenna measurements.
- What are the advantages of Anechoic chambers? Compare between two types of chambers with help of simple graph.
- What are the main components of the antenna range measuring system?

GOOD LUCK

						
	PROGRAM/ YEAR	(ELECTRICAL POWER & MACHINES) 2015-16	SEMESTER		CONTIN.	
	COURSE TITLE:	Electrical Testing II	COURSE CODE:		EPM426	
DATE:	31-5-2016	TOTAL ASSESSMENT MARKS	100	TIME ALLOWED	2 HOURS	FRESH

Attempt all the following questions:

Power System Lab.:

1. Draw and Explain the following lab experiment:
 - Over current protection.
 - Three phase power factor improvement.
2. Fully discuss with drawing the following protection types:
 - Distance protection.
 - Differential protection.
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1. (a) Discuss the principle of operation of three phase induction motor.

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High Voltage Lab:


1. Explain with drawing, experimentally the measurement of high voltage (AC) by two spheres.
2. (a) Define earthing process and explain the meaning of earth resistance and how should it differ with the size of electrical system.

(b) How to deal with two high earth resistance.

(c) Explain the earth shells around earth electrode.

(d) What is the soil resistivity and explain experientially how to measure it.

(e) Define the partial discharge and explain the process of discharge in voids.

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING					
	PROGRAM/ YEAR	(COMPUTER & CONTROL) 2015-16	SEMESTER		SECOND	
	COURSE TITLE:	LABORATORY EXAM	COURSE CODE:		CCE425	
2016		TOTAL ASSESSMENT MARKS:	50	TIME ALLOWED:	3 HOURS	FRESH

Part I (Computer)

Question (1) (12 marks)

- What are the sampling and quantization of an image? (3 marks)
- Is the following statement true or false? "Linear contrast Stretching transformation increases the value of the gray levels in an image." Give reason for your choice. (2 marks)
- When applying a Local Histogram Equalization (LHE) on an image, what is the effect of choosing the local window size (when it is increased and when it is decreased) on the performance of LHE? (3 marks)
- Compare among General Histogram Equalization (GHE), Local Histogram Equalization (LHE), and Bi-histogram Equalization. (4 marks)
 - Subjectively (i.e. the difference in terms of the visual results)
 - Objectively (i.e. the difference in terms of the mean and Standard Deviation)

Question (2) (13 marks)



- Is the following statement true or false? "The visual evaluation of image quality is a highly subjective process." Give reason for your choice. (2 marks)
- What is the effect of the Gamma correction, when it is increased and when it is decreased, on an image? (3 marks)
- Modify the gray scale of the 6×6 pixel image shown in **Figure 1** such that the histogram of the processed image is as close as possible to be in the gray-scale range is [0, 15]. Determine the enhanced image based on: (8 marks)
 - Histogram Equalization.
 - Bi-histogram Equalization.

What is the difference between the two images obtained from i and ii?

8	8	6	7	5	4
7	4	4	6	7	8
4	5	4	5	8	5
4	5	4	5	5	4
4	4	8	8	5	4
7	5	8	5	4	4

Figure 1

END OF COMPUTER PART

	PORT-SAID UNIVERSITY				
	Faculty of Engineering				
	Department of Electrical Engineering				
	2 nd Term Final Exam, 4 th Year, Computer & Control Eng.				
	Course Title:	Computer and Control Lab.		CCE425	
14/6/2016	Total Marks:	50	Time: 3 Hrs.		

Answer All Questions:

Part II: Control Lab.

Question No. 1: [A=3 Marks, B=3 Marks]

- [A] What is programmable logic controller. What type of task might a control system handle ?. What form might a controller have ?. [Illustrate your answer with drawing a control system and shows the input and output devices].
- [B] Draw and describe a typical AC digital input module of a PLC. What are the main tasks of a PLC input module?.

Question No. 2: [A=5 Marks, B=4 Marks]

Use the practical steps to construct PLC ladder diagram [draw the logic diagram, I/O addressing, PLC connection, and draw the ladder diagram] for the following:

- A motor is switched ON by pressing a spring-return push button start switch, and the motor remains ON until another spring-return push button stop switch is pressed. A light is to come ON if there is no input power or not.
- A fan is to be started and stopped from any one of three locations. Each location has a start and a stop push button.

Question No. 3: [A=6 Marks, B=6 Marks]

- [A] If $m=2$ Kg, $b=10$ N.s/m, $k=20$ N/m, and $f=1$ N for the spring-mass-damper system shown in the Figure 1:
- Derive the differential equation relating $x(t)$ and $f(t)$. What would be the effect of neglecting the mass ?.
 - If the PID controller is applied to the system of Figure 1. Find the closed-loop transfer function and sketch the response of the controller type which is used to :
 - Eliminate any steady-state error that would occur with proportional control only.
 - Increase the system stability.
- [B] Figure 2 shows a position control system, for a disturbance signal set to zero :
- Derive the general closed-loop transfer function and find an expression for the damping ratio ζ .
 - Construct the Simulink model for the control system. If $K_d = 0.2$, find the damping ratio.
 - If the desired value of damping ratio $\zeta = 1.2$, what value of derivative gain should be selected ?.

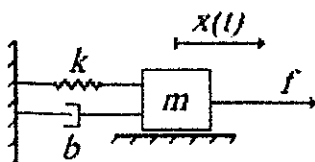


Figure 1

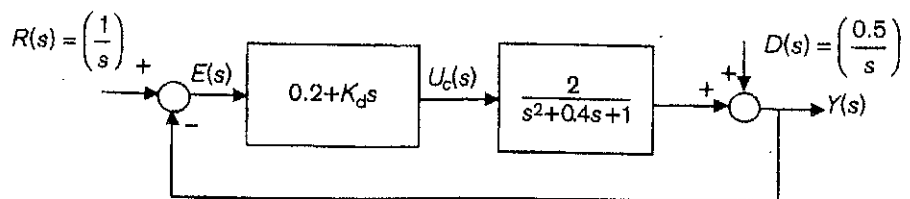


Figure 2

With Best Wishes

Examiner : Dr. A. El-Saadawi

5. Explain the following effects in Cellular Mobile Communication and how can you Reduce their effect? (6 marks)

- i. Rician fading,
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Question (3): (13 marks)

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Dr. HebaAbd el Atty

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING				
	PROGRAM/ YEAR	ELECTRONIC & COMMUNICATION	SEMESTER	SECOND	
	COURSE TITLE:	MOBILE COMMUNICATIONSSYSTEMS	COURSE CODE:	ECE- 464	
DATE	4-6- 2016	TOTAL ASSESSMENT MARKS	70	TIME ALLOWED	3 HOURS
					FRESH AND RESET

QUESTION (1): (26 marks)

- Complete the following sentences (6marks)
 - GPRS upgrades the GSM system by using new which is compatible with ... for voice call
 - GPRS upgrades the GSM system by new software for and new software and hardware for.....
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 - Mobile systems use..... (full-duplex, half-duplex, simplex) channel which is..... (one-way channel, two-way on two separate channels, two-way on the same channel)
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- What is the Criteria for Handover (3 marks)
- Define (3 marks)
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question (2) : (20 marks)

- Draw the IS-95 Uplink transmission from the base station to mobile station (4marks)
- What is the difference between scrambling and spreading? (2 marks)
- Write the Properties of CDMA. (4 marks)
- What is the difference between Walsh CODE and OVSF. (4 marks)

QUESTION THREE:**[14 Marks]**

- a) Derive an expression for specific energy output on level track using a simplified speed-time curve
- b) A **254 Ton** electric train operating on a uniform upgradient of **1%**, the speed-time curve for the train movement comprises:
 1. Uniform acceleration from the rest for **40 seconds** raising the speed to **51.52 Km/hr**.
 2. Steady speed at **51.52 Km/hr** with power ON for **20 seconds**.
 3. Coasting with power OFF for **50 seconds**.
 4. Braking at **3.2 Km/hr/sec** to standstill.
 - Calculate the specific energy output.
(Let the tractive resistance constant at **44.5 N/Ton** and allow **10 %** for rotational inertia).
 - Draw the speed-time curve for this train.


QUESTION FOUR:**[14 Marks]**

- a) Why DC series motors are suitable for traction purposes?
- b) Draw and discuss the Torque-Current, Speed-Current and Speed-Torque curves for series and shunt DC motors.
- c) Discuss how to start DC traction motors using Series-Parallel starting method.
- d) There are three transition methods in series parallel starting, **explain only one method**.
- e) Two 600 V motors each having a resistance of 0.1Ω are started on the series-parallel system, the mean current per motor during the starting period is 300 A. The starting period is 15 seconds and the train speed at the end of this period is 29 km/hr. Calculate:
 - The rheostatic loss in kWh during series and parallel combinations of motors.
 - The train speed at which transition from series to parallel must be made.
 - Starting efficiency.

QUESTION FIVE:**[14 Marks]**

- a) Mention the main components of electrical drive systems, explain how to determine the stability of the system operating point (take the induction motor as example).
- b) Discuss with drawing how to use power electronics converter to drive DC traction motors.
- c) Derive the state space model of separately excited DC motor . let $x_1=i_a$, $x_2=\omega$

Good Luck
Dr. Mahmoud Fawzi

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING				
	PROGRAM/ YEAR	4TH YEAR POWER AND MACHINES	SEMESTER	FIRST	
	COURSE TITLE:	ELECTRIC TRACTION	COURSE CODE:	EPM462	
DATE:	2016	THEORY ASSESSMENT (40%)	70	3 HOURS	FRESH

QUESTION ONE:
[14 Marks]

- What are the requirements of an ideal traction system?
- Draw the speed-time curve of an electric train and **define** the following terms:
 - Crest speed.
 - Average speed.
 - Scheduled speed.
- Using a simplified speed-time curve of a railway train, **derive** the expression :

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{7200}{V_m^2} D \left[\frac{V_m}{V_a} - 1 \right]$$

Where α and β are the acceleration and deceleration in km/hr/sec, V_m and V_a are the maximum and average speeds in km/hr and D is the distance between stops in km.

- A train is required to run between two stations **1.6 km** apart at the average speed of **40 km/hr**. the run is to be simplified quadrilateral speed-time curve. If the maximum speed is to be limited to **64 km/hr**, acceleration to **2 km/hr/sec** and coasting and braking retardation to **0.16 km/hr/sec** and **3.2 km/hr/sec** respectively,
 - Determine** the duration of acceleration, coasting and braking periods.
 - Draw** the speed time curve for the run

QUESTION TWO:
[14 Marks]

- Derive an expression for the tractive effort developed by a train unit.
- Place a (✓) mark in front of the right answer and a (×) mark in front of the wrong answer, and then **correct** the wrong one.
 - The area under the speed-time curve equal to the distance between stations.
 - The tractive effort at the coasting period depends on the train weight.
 - The schedule speed gives a data about the train movement including the stops between stations.
 - The acceleration at the free running period depends on the train weight.
- An electric train weighing **250 Tons** has **4 motors** geared to driving wheels, each motor develops **5000 N.m** during acceleration, starts from the rest. If up gradient is **25 in 1000**, gear ratio is **5**, gear transmission efficiency is **88%**, wheel radius is **44 cm**, train resistance is **50 N/Ton**, addition rotational inertia is **10%**, **calculate** the time taken to reach a speed of **45 Km/hr**.
 - If the supply voltage were **1500 V d.c** and efficiency of motors is **83.4%**, **determine** the current drawn per motor.

Question3: (18 marks)

1. The modulating signal $m(t) = 100 \text{ rect}(2Jt/f)$ where $f = 1000 \text{ Hz}$ and $f_c = 20000 \text{ Hz}$
 - a. Sketch spectra of $m(t)$.
 - b. Sketch the corresponding DSB-SC.
 - c. To find the LSB spectrum, suppress the USB spectrum in the DSB-SC spectrum (6marks)
2. Fig.3 shows a scheme for coherent demodulation. show that this scheme can demodulate the AM signal $[A + m(t)] \cos \omega_c t$ regardless of the value of A (6 marks)





Fig.3

3. Given the modulated signal $y(t) = [A + m(t)] \cos(\omega_c t)$, where $A=2$, & $m(t)=1.5 \sin(t)$,
 - a. Sketch $y(t)$
 - b. How can the baseband signal $m(t)$ be recovered correctly from $y(t)$ Explain why. (6 marks)

Question 4: (17 marks)

1. Draw the BPSK modulator and demodulator and explain each block briefly. (4 marks)
2. If the input to the FSK modulator is 10101110101. Draw the FSK signal output (3 marks)
3. If the input to the PSK modulator is 10110110011. Draw the PSK signal output (3 marks)
4. For QPSK modulator with fundamental frequency of 15 MHz and a carrier frequency of 80 MHz, determine the minimum double sided Nyquist bandwidth, the baud rate and draw the output spectrum determine the maximum and minimum upper and lower side frequencies. (7 marks)

Good Luck
Dr. Heba Abd El Atty

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING					
	PROGRAM/ YEAR	(COMPUTER AND CONTROL) 3 rd year	SEMESTER		FRIST	
	COURSE TITLE:	Communication theory and system	COURSE CODE:		ECE422	
DATE:	11-6-2016	TOTAL ASSESSMENT MARKS	70	TIME ALLOWED	2 HOURS	FRESH

Question 1: (17 marks)

1. From your point of view, what are the advantages of digital communications systems over traditional analog systems? (3 marks)
2. Classify types of Signal (3marks)

3. Using the properties of the Fourier transform to find Fourier transform for **Fig1 (a)** and inverse Fourier transform of the spectra shown in **Fig. 1(b)** (6marks)

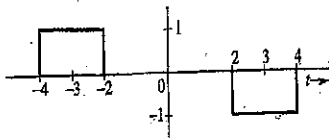


Fig.1 (a)

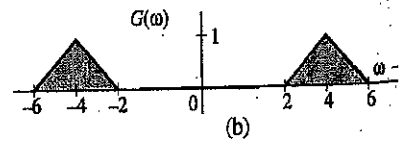


Fig.1 (b)

- 4- Find the compact Fourier series and sketch the corresponding spectra for the impulse train as shown in **Fig2** (5marks)

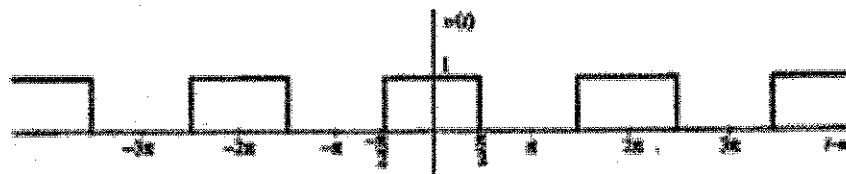


Fig2

Question 2: (18 marks)

1. Differentiate between Power and energy Signal. (2 marks)
2. Explain the ring modulator to modulate an AM signal. (4 marks)
3. Explain the envelop detector and mention two conditions to detect the signal. (4marks)
4. A modulating signal $m(t)$ is given by: $m(t) = \cos 1000t \times \cos 2000t$, determine the following: (8 marks)
 - a. Sketch the spectrum of $m(t)$.
 - b. Find and sketch the spectrum of the DSB-SC signal $m(t) \cos 4000t$.

From the spectrum obtained in (b), suppress the LSB spectrum to obtain the USB signal.

What is the minimum carrier frequency needed to modulate the signal in order to recover $m(t)$.

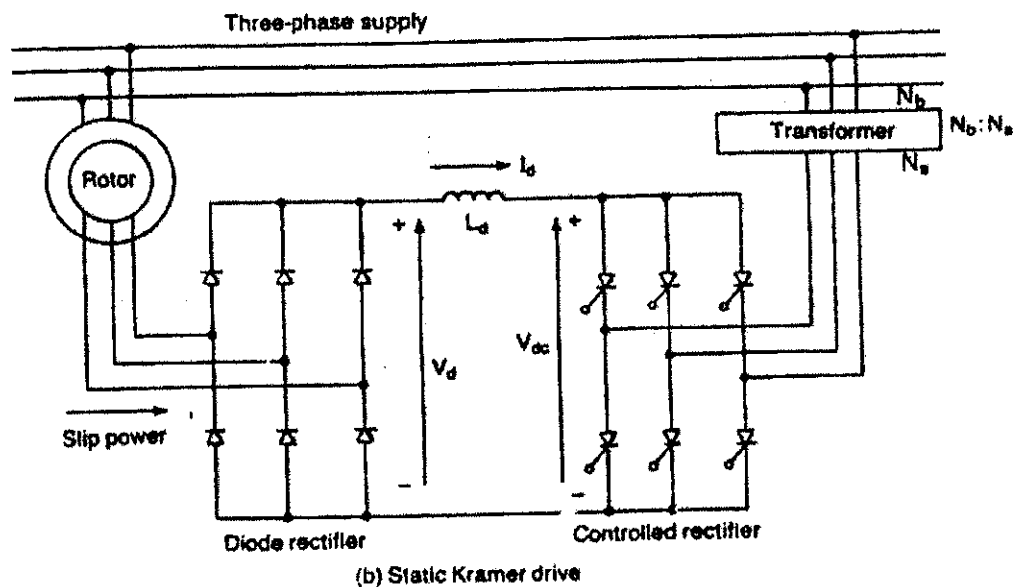
Question no.4 :

- (i) What is the field weaken mode of induction motor
(ii) Draw the static Kramer drive?
(iii) A three-phase 460-V 60-Hz six-pole, Y-connected wound –rotor induction motor whose speed is controlled by a static Kramer drive as shown in figure has : $R_s=0.11 \Omega$, $R_r=0.09 \Omega$, $X_s=0.4 \Omega$, $X_r=0.6 \Omega$, $X_m=11.6 \Omega$, the turns ratio of the rotor to stator windings is $n_m=N_r/N_s=0.9$. The inductance L_d is very large and its current I_d has negligible ripple. The no load losses is 275 w the turns ratio of converter ac to supply $n_c=N_a/N_b=0.5$. If the motors is required to operate at speed of 950 rpm .

Calculate:



- (a) the inductor current (I_d)
(b) the dc voltage (V_{dc})
(c) the delay angle of converter
(d) the efficiency
(e) the input power factor of the drive
(f) plot the power factor against turns ratio n_c

The load torque which is proportional to speed squared is 455 N.m at 1175



[25 marks]

With best wishes
Dr. A.Kalas

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL ENGINEERING					
	Program/ Year		Model answer			
	COURSE TITLE:	Control of Electrical Machines	COURSE CODE:		EPM105	
DATE:	11/6/2016	TOTAL ASSESSMENT MARKS	70	TIME ALLOWED:	3 HOURS	FRESH

Question no.1 :

[Write the correct of these statements]

- The electrical machines is meant high cost will be low efficiency.
- Chopper circuit meant change voltage and frequency.
- The current drawing from supply of induction motor is increased with frequency increased.
- The torque and power can change with gear ratio.
- The load torque not more than two types, and blower torque is proportional with speed cubic.

[10 marks]

Question no.2 :

- Write how to select the electrical motor?
- What is the field weaken mode of induction motor?
- Write in brief about how to produce PWM Technique?
- Draw the Cycloconverter block diagram?
- What are the advantages of V/F control?

[15 marks]

Question no.3 :

- What are the advantages and disadvantages of single phases full converter fed DC motor drive?
- Draw the DC series motor in operating modes?
- The speed of a separately excited dc motor is controlled by a single-phase semi-converter drive. The field current is also controlled by a semi-converter and the field current is set to the maximum possible value. The ac supply voltage to the armature and field converter is one-phase, 208 V, 60 Hz. the armature resistance is $R_a = 0.12\Omega$, the field resistance is $R_f = 220\Omega$, and the motor voltage constant is $K_v = 1.055 \text{ V/A-rad/s}$. The load torque is $T_L = 75 \text{ N.m}$ at a speed of 700 rpm. . The viscous friction and the no-load losses are negligible. The armature and field currents are continuous and ripple-free.

Determine:

- Draw the circuit of single phase semiconverter drives
- The field current I_f .
- The delay angle of the converter in the armature circuit α .
- The input power factor of the armature circuit.

[20 marks]

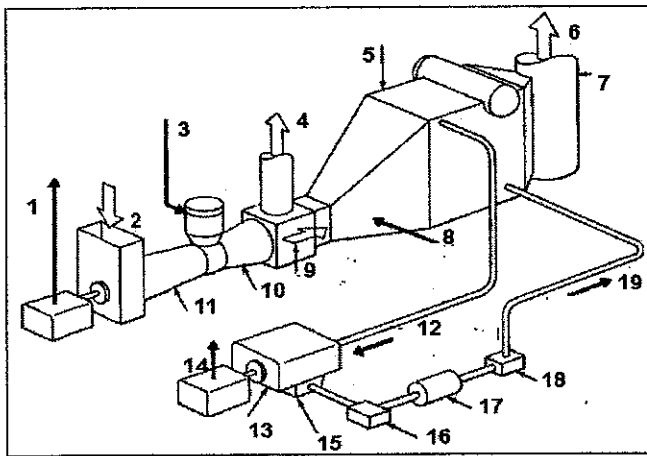


Fig. III-2

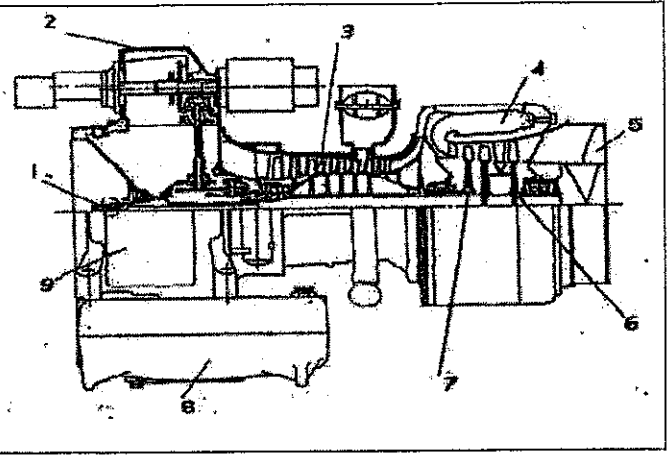


Fig. III-3

[9 Mark]

III.(B) What are the main objectives of the following: - Partial admission control of steam turbines – Velocity compounding of steam turbines – Moderator in nuclear reactors – Steam injection in gas turbine plants – Air swirler in atomizer. [5 Mark]

III.(C) What are the sources of exergy losses in combined-cycle power plants? [8 Mark]

IV. (A) In large steam power plants the first stage of the turbine is usually velocity compounded. Sketch the dimensionless velocity triangles of such stage with two-moving rows using the following data: axial stage with constant flow coefficient from inlet to exit of 0.85, whirlless inlet and exit absolute velocity of steam to the stage, and zero degree of reaction [5 Mark]

IV. (B) For the above stage sketch the expansion process on (T-s)-diagram and calculate the stage enthalpy coefficient and the internal power developed, if the mean blade velocity is 220 m/s and the steam mass flow rate is 100 kg/s. [3 Mark]

IV. (C) On the above (T-s)-diagram of the velocity compounded stage indicate the areas corresponding to the specific exergy losses in each blade row. [2 Mark]

V. Figure 5 shows the arrangement of a combined plant with helium-cooled nuclear reactor. The mass flow rate of He compressed is 200 kg/s. Water mass flow rate for LP-drum is 20 % of the total. Compressor and GT polytropic efficiency is 0.92. Condenser pressure is 0.07 bar. All other necessary data are given in the figure. Assume straight line expansion in (h-s)-diagram for both portions of the steam turbine, neglect the works of the pumps, all mechanical and generator losses and calculate: 1. The mass flow rate of steam generated from HP- and LP-sections. 2. The net power of the steam turbine generator. 3. The net power of the gas turbine generator. 4. The overall thermal efficiency of the combined plant. 5. Draw a rough sketch for the (T-Q)-diagram of the steam generator indicating the different heating sections. [20 Mark]

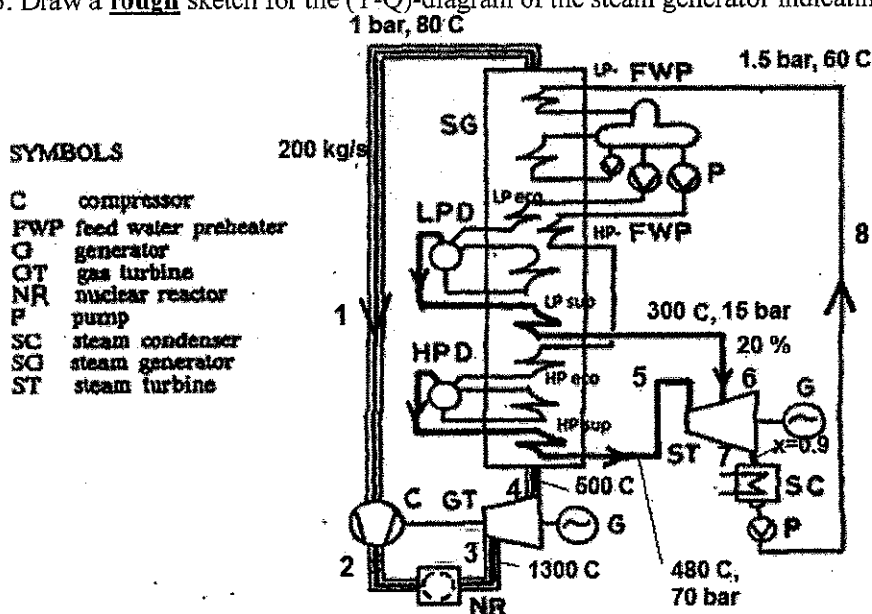

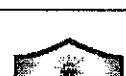


Fig. 5: Combined cycle with helium-cooled NR & dual pressure boiler

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF MECHANICAL POWER ENGINEERING					
	YEAR:	4 TH MECHANICAL POWER - 2015-16	SEMESTER:		SECOND	
	COURSE TITLE:	THERMAL POWER PLANTS	COURSE CODE:		MEP408	
DATE:	MAY 2016	TOTAL ASSESSMENT MARKS:	100	TIME ALLOWED:	3 HOURS	&FRESH RESET

Make any necessary assumptions. Use of steam tables & chart is allowed. The maximum mark is 100. Take c_p for helium 5.2 kJ/kgK and $R=2.07$ kJ/kgK. For water $c_p = 4.18$ kJ/kgK and $\rho = 1000$ kg/m³.

I. Answer with **Yes** or **No** giving the reasons:

- Regeneration and reheating in steam power cycle does not affect the boiler exergy losses.
- Main exergy losses in boiler are due to exhaust gas losses.
- Use of split-shaft gas turbine is to increase the turbine power.
- Compressor working range affects the gas turbine power plant operating range.
- Reheating is mainly to increase the turbine work.
- Boiling water nuclear reactor is capable to meet sudden load changes.
- Nuclear power plants are essential for Egypt, in spite of exploring a large number of natural gas fields.
- Graphite is used as moderator in water cooled nuclear reactors.
- Solid coal can never be used in open-cycle gas turbine power plants.
- Superheated steam cannot be generated in water-cooled nuclear reactor plants.
- Steam temperature at turbine inlet is increased with increased load.
- For a steam turbine driving a ship there is no need for a speed governor.
- The shape of steam turbine designed for nuclear plant differs than that for fossil-fuel-fired steam plant.
- It is recommended to run the open-cycle gas turbine at its full rated power.
- At part load operation of gas turbine plant the compressor pressure ratio is independent of the fuel mass flow rate.
- Turbine blade cooling increases the thermal efficiency of gas turbine plant.
- Regeneration in gas turbine cycle is more effective for lower compressor pressure ratio.
- Selection of the type and the size of power generating units has nothing to do with the load curve of the electric power system.
- The peak diversity factor of a group of consumers is always greater than one.
- Sliding pressure control enables meeting sudden load change in steam power plants.

[30 Mark]

II. (A) Sketch the arrangements of the following thermal power plants, naming each component:

- Combined plant with fluidized bed firing system.
- Solar-assisted thermal power plant.
- Geothermal co-generation plant with flash evaporation and central heating system.
- Nuclear steam power plant with liquid-metal-cooled reactor.

[12 Mark]

II. (B) State briefly the main advantages of combined Rankine-Kalina power plants.

[3 Mark]

II. (C) Explain with aid of sketches the method of load control for each of the following plants:

- Closed-cycle gas turbine power plant.
- Steam power plant using modified sliding pressure control.
- Boiling water reactor nuclear power plant.

[9 Mark]

III. (A) Write the name and the type of the following and the elements names of each:

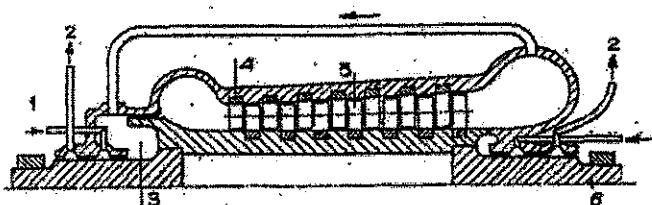




Fig. III-1

- b. The data based on actual results, as a shipowner's guide to what are the economical tolerances, are: 1), 2), 3), and 4)
6. a. Related work standards should be written and adhered to for such matters as: 1), 2), 3), and 4)
- b. The objectives of an accuracy control program are: 1), 2), and 3)
7. a. Members of an A/C group in a hull construction department prepare check sheets which designate: 1), 2), 3), and 4)
- b. Measuring activities during subassembly should concentrate on: 1), 2), and 3)
8. a. The main jobs of the troubleshooting team are: 1), 2), 3), and 4)
- b. During the block assembly stage, just before erection, checks should include: 1), 2), 3), and, for curved blocks, 4)

With All My Best Wishes !!!

Dr. Randa Ramadan.

May 2016

	PORT SAID UNIVERSITY FACULTY OF ENGINEERING DEPARTMENT OF NAVAL ARCHITECTURE & MARINE ENGINEERING					
	PROGRAM/ YEAR	NAME – 4 th Year		SEMESTER	SPRING	
	COURSE TITLE:	SHIP PRODUCTION & ACCURACY CONTROL		COURSE CODE:	NME426	
	DATE	28-5-2016	FINAL EXAM	70 MARKS	TIME ALLOWED: 3 HOURS	
						FRESH

FOLLOW THE WRITTEN INSTRUCTIONS:

QUESTION (I): COMPARE BETWEEN EACH OF THE FOLLOWING:[24 MARKS]

1. a. End-product tolerance vs. Interim-product tolerance.
- b. Requirements for flat-block check sheets vs. those for curved-block check sheets.
- c. The advantages vs. disadvantages of maintaining large stocks in shipyards.
- d. Regular analysis vs. urgent analysis.
- e. The two main types of rework, with the help of the necessary figures.
- f. The two ways of distributing excess.

QUESTION (II): ANSWER ALL OF THE FOLLOWING QUESTIONS:[24 MARKS]

2. a. What is the role of the A/C planners?
- b. With the help of the necessary figure, explain the relationship of standard ranges and tolerance limits.
3. a. Explain all six work standards required for building a ship.
- b. For each work stage, state all the items to be checked for conformance with accuracy standards.
4. a. What are the six main checks that are to be done for all curved shell parts?
- b. Loft processes should include essential A/C requirements, state them.

QUESTION (III): COMPLETE ALL THE FOLLOWING QUESTIONS:[24 MARKS]

5. a. In the absence of good systems for collecting and evaluating accuracy data, the following typical questions are neglected: 1), 2), 3), and 4)

"Marine Pollution and Protection of Marine Environment" (GEN402)

Answer All Questions:

Question#1: [10Points]

a-What is meant by the word "Marine Pollution"? Discuss the terms: Inputs and Contamination.]

b-State the methods of cleaning up oil spills? Discuss two of them.

Question#2: [10Points]

a-Correct the wrong statement:

- Heavy waxy oil spreads faster and to a thinner film than light oil.
- Dispersants are very effective against heavy oil.
- Segregated ballast space is used as defensive space from collision and grounding.
- Towing booms at sea in "U" or "J" configuration is an easy task requiring no specialized vessel.
- Vessel-based skimming system removes oil from closed water.

b- Illustrate the equation is used to calculate the potential oil outflow in collision.

c- With the aid of neat sketches, mention the types of segregated ballast space.

Question#3: [10Points]

a- State the main sources of oil in Marine Pollution and discuss the Crude Oil Washing system (COW).

b-Complete:

- i- Mechanical containment is used to ...
- ii- Basic elements of the construction of the booms are...
- iii- Segregated ballast space is used as...
- iv- The oil removed from the beaches is...

c- Give an alternative of double hull tanker indicating its principal and advantages.

Question#4: [10Points]

a- State the objective of the environmental tanker design method

b- Skimmers are used for recovering Spilled Oil from the water's surface. Stat their different types and explain the idea behind each type.

Prof. L. Kamar

Q2. [Continue]

- B- What are the reasons for conducting speed and power trials on a new ship? How may the speed trials be conducted? What data are recorded? And how is the analysis undertaken?
-

Q3. [(10+20) Marks]

- a- Discuss the advantages claimed by the Vertical Axis Propeller. You may also mention some objections to use such propeller type in certain vessel.
- b- A single screw tug of 30.4 m long has an effective power of 60 kW at sea trial of 7 knots towing speed, corresponding to its MCR power of 850 kW at 180 RPM. Using the B.4.55 diagram provided, calculate the towing pull, given that the shafting efficiency, $\eta_s = 0.92$, torque identity wake fraction, $w_Q = 0.24$ and the thrust deduction factor, $t = 0.12$.

Assuming that under a service condition, the surface roughness of the tug propeller has been deteriorated to Rubert Grade E., and the corresponding calculated results are given as:

$$\% \quad (\Delta K_Q/K_Q)_P = 0.397$$

$$\% \quad (\Delta K_T/K_T)_P = -0.919$$

$$\% \quad (\Delta J/J)_P = -0.305$$

Show the effect of the above propeller roughness on the following:

- Towing pull
- Propeller efficiency
- Power penalty to maintain the tug speed

Good Luck!

Prof. Dr. M. A. Mosaad

Q1: [(10+25) Marks]

- A. What are the main causes of the blade surface deterioration? Define the Average Propeller Roughness, APR and describe a procedure to calculate the added power due to underwater propeller surface roughness, giving an example.
- B. A ship is to be fitted with two diesel engines geared to a single shaft and driving a 4-bladed C.P propeller. Each engine has a brake power of 1500 KW and the propeller rate of rotation is kept constant at 225 RPM.

Using the diagrams provided, determine the diameter and mean face pitch of a propeller suitable for the 1-engine cruise condition for which the ship speed, V_s is 15 knots, thrust deduction, $t = 0.1$, wake fraction, $w_Q = 0.24$ and shafting efficiency, $\eta_T = 0.98$.

In the 2-engine condition the ship speed increases to 16.5 knots and the wake fraction remains unchanged. Using the propeller diameter previously determined, calculate the increased propeller pitch and the propeller efficiency. What conclusion would you draw from the result of the later calculation?

$$B_p = 1.158 \frac{NP_D^{0.5}}{V_a^{2.5}}, \quad \delta = 3.2808 \frac{ND}{V_a}$$

Q2. [(15+10) Marks]

- A. Estimate the service speed for a ship of standard length 121.92 m and block coefficient, $C_B = 0.67$.

Establish from the table of average \textcircled{C} values given for C_B equal to 0.67, the \textcircled{C} at the service speed for a single ship of the standard dimensions.

If the block coefficient and length remain the same but the beam is increased by 5% and the draft reduced by 8%, what effect does this have on \textcircled{C} at service speed?

F_n	0.1787	0.2085	0.2382	0.2680
\textcircled{C}	0.645	0.670	0.688	0.713
y	0.57	0.60	0.64	0.69
x	0.9	0.9	0.9	0.9

The following information may be help :

$$100 F_n = 23.0 - 4 \tan (8 C_B - 5.6)$$

$$\log(\textcircled{C}_D / \textcircled{C}_B) = (x-2/3) \log(B_D/B_B) + (y-2/3) \log(T_D/T_B)$$