



Course Title: Technical Reports  
Date: June 2017 (Second Term)

Course Code : MEP 12H4  
Allowed Time : 2 Hours

Year : 1<sup>st</sup>  
No. of Pages: (2)

**Remarks: (Answer all the following questions. Assuming any missing data)**

**Question Number (1)**

**(25 Marks)**

**Complete the empty spaces in the following phrases with suitable words from list shown below:**

**(You can use one word twice. It is not necessary to use all words in the list)**

- 1) .....Are interpersonal performances in which concise technical information is provided to an attending audience.
- 2) ..... Are objective documents that identify and evaluate solutions to issues or problems in work.
- 3) During.....stage of report writing the report conclusions should be drawn.
- 4) Writing the single sentence states the subject, scope, and purpose of the report usually happens in .....stage of report writing.
- 5) In the ..... stage of report writing attention is directed to how results should be presented in the report.
- 6) .....Is a graphic or an image that conveys information or a message.
- 7) ..... Are simplified sketches of a process or object.
- 8) ..... are a type of informal line art that become prevalent with computer spreadsheet software and tabular data.
- 9) ..... is a classic way to show the relative portions of a whole by illustration.
- 10) ..... Are helpful illustrations relating to project management. They detail tasks, who is to do them, and by when.
- 11) Captions are placed ..... a chart or graph, or they may be placed ..... the graph
- 12) ..... is the use of another's work without permission.
- 13) ..... is imposing a personal opinion or proclivity in your writing.
- 14) ..... is a set of rules and standards for using communication skills and resources with the intention of doing good.
- 15) The .....section of technical report describes what you learned about the problem as a result of your research.
- 16) The .....section of technical report makes the body easier to understand, and shows where additional information can be found.



- 17) .....is a type of technical reports that look at several approaches for solving a problem and recommend the most suitable approach.
- 18) .....is a type of abstract that summarizes the substance of a report, not its structure.
- 19) ..... is an abstract that used for large technical reports or proposals. Contains both the substance and the structure of a report.
- 20) ..... is a type of communication network in which a formal approach adopted by a hierarchical organization from downward and upward communication.



Words List

Pie Chart	Recommendation report	Chain network	Connected network	Executive abstracts
Informative abstracts	Proposal	Outlining stage	Wheel network	Presentations
Analyzing and Sorting the Results	Schematics	Descriptive abstracts	Charts	Data gathering
Illustration	Plagiarism	Acronyms	Above	Timelines
Bias	Back matter	Ethics	Results and discussion	Below
Front matter	Project Reports	Besides	Checklist	Photographs

**Question Number (2)**

**(15 Marks / 3 Mark for each sub question)**

- 1) Plagiarism actually cost more in time and money than it was worth. List down the methods to avoid plagiarism in technical writing.
- 2) When should you use an illustration in technical writing? What are the three basic categories of illustrations used in technical writing?
- 3) Write a personal profile in which you highlight key points that you want an employer to know about you, when applying for a proposed position as a thermal power plant maintenance engineer.
- 4) A rough draft is "a late stage in the writing process". Comment on that statement, and mention the steps required for writing the rough draft.
- 5) Technical Reports may vary in their purpose, but all of them must contain four similar characteristics. Declare these characteristics.

Tanta University		Department: Mechanical Power Engineering		Faculty of Engineering
Course Title: Thermodynamic (1)		Course Code: MEP 1202	1 <sup>st</sup> : years	
Date: 7 – 6 – 2017	Allowed time: 3 hrs Full Marks: 90		No of Pages: 2	
Name: Prof. Dr. Abd Elnaby Kabeel; Dr. Mohamed Abdelgaied			Final Exam	
<b>Answer the following questions:</b> و خريطة البخار يسمح للطالب باستخدام جداول البخار				

### Question No. 1

Marks

(16)

- a) What the difference between:
- Intensive and extensive properties.
  - Critical and triple point.
  - Open and closed system.
- b) A piston–cylinder device contains  $0.1 \text{ m}^3$  of liquid water and  $0.9 \text{ m}^3$  of water vapor in equilibrium at 800 kPa. Heat is transferred at constant pressure until the temperature reaches  $350^\circ\text{C}$ .
- (a) What is the initial temperature of the water?
  - (b) Determine the total mass of the water.
  - (c) Calculate the final volume.
  - (d) Show the process on a P-v and T-v diagrams with respect to saturation lines.

### Question No. 2

(16)

- a) Discuss with drawing the effect of delivery pressure on the volumetric efficiency.
- b) A well-insulated rigid tank contains 5 kg of a saturated liquid–vapor mixture of water at 100 kPa. Initially, three-quarters of the mass is in the liquid phase. An electric resistor placed in the tank is connected to a 110-V source and a current of 8 A flows through the resistor when the switch is turned on. Determine how long it will take to vaporize all the liquid in the tank. Also, show the process on a T-v diagram with respect to saturation lines.

### Question No. 3

(25)

Consider a steam power plant that operates on a simple ideal Rankine cycle, the mass flow rate of steam through the cycle is 35 kg/s. The inlet and exit conditions for each component of steam power plant are shown in table blow.

Component	Inlet condition	Exit condition
Turbine	Pressure 10 MPa, Temperature $550^\circ\text{C}$	Pressure 10 kPa, Quality 90 percent
Condenser	Pressure 10 kPa, Quality 90 percent	Pressure 10 kPa, Saturated liquid

Pump	Pressure 10 kPa, Saturated liquid	Pressure 10 MPa, Temperature 160 °C
Boiler	Pressure 10 MPa, Temperature 160 °C	Pressure 10 MPa, Temperature 550 °C

Determine:

- Turbine output power.
- Heat rejected from the condenser.
- Pump input power.
- Heat added to the boiler.

(17)

#### Question No. 4

- For the adiabatic process prove that

$$\frac{T_2}{T_1} = \left(\frac{P_2}{P_1}\right)^{\frac{\gamma-1}{\gamma}} = \left(\frac{V_1}{V_2}\right)^{\gamma-1}$$

- A quantity of gas occupying 0.14 m<sup>3</sup> at 9.65 bar and 371 °C is heated during a constant volume process until the pressure reaches 41.4 bar. The gas is then expanded adiabatically to a pressure of 2.76 bar. Given that R = 0.288 kJ/kg K and  $\gamma = 1.41$  calculate:

- The temperature at the beginning of expansion.
- The temperature at the end of expansion.
- The heat energy supplied.
- The work energy transferred.

(16)

#### Question No. 5

The clearance volume of single cylinder air compressor is 10 % of the swept volume. The compressor has a bore of 120 mm a stroke of 152 mm, and run at 400 rev/min. suction condition are 1 bar and 24°C, the delivery pressure is 10 bar. It may be assumed that during the compression process, 12 % of the power supplied to the air is rejected as heat energy through the cylinder walls. Take the atmosphere air conditions are 1.013 bar and 15.5 °C, and assuming the mechanical efficiency of 74%. Calculate:

- The diagram volumetric efficiency.
- The rate of air delivery.
- Power input required to drive the compressor
- True volumetric efficiency.

\*\*\*Good luck.\*\*\*

### Final Exam of Strength and Materials Testing

Solve all of the following questions in the two pages  
You may answer in english as well as in arabic

#### Question 1 : ( 25 marks )

- Explain how can we determine the Unwin's constants experimentally.
- Estimate the slope angle of fracture plane in compression.
- A compression test is performed on cast iron specimen with a circular cross-section of diameter 35 mm. The readings of load and associated contraction were as following:

load ( ton )	0	2.7	6.8	10.2	13.6	20.3	27.2
contraction ( mm )	0	0.056	0.14	0.208	0.28	0.457	0.71

The gauge length was 250 mm.

Draw the stress-strain diagram and hence identify:

fracture stress – initial tangent modulus – the tangent modulus at stress of  $2100\text{kg/cm}^2$  – the secant modulus at stress of  $2100\text{kg/cm}^2$  – modulus of toughness

#### Question 2 : ( 20 marks )

- What are the difficulties of compression test? How can we overcome these difficulties?
- Explain the method of work for one of the mechanical strain gauges.
- A bending test was made on a metallic beam with span 80 cm and square section. The beam was loaded with a concentrated load at its mid-span. If the modulus of elasticity of the beam material is  $400\text{ ton/cm}^2$  and the readings of load and deflection in the mid-span of beam were as following:

load ( kg )	0	24	48	72	108	144	192	216	240	264
deflection ( mm )	0.0	0.32	0.64	0.96	1.44	1.92	2.56	2.93	3.3	3.79

Draw the load-deflection diagram and then determine:

dimensions of the beam section – proportional limit stress – modulus of rupture  
– modulus of resilience – modulus of toughness.

**Question 3 : ( 25 marks )**

- a) State the types of shear tests and Explain one of these types in detail.
- b) A driving shaft of 3 m long and 10 cm in diameter is made from an alloy steel with a yield strength in torsion of  $3000 \text{ kg/cm}^2$ , modulus of rigidity  $1000 \text{ ton/cm}^2$  and ultimate shear strength  $5000 \text{ kg/cm}^2$ . Determine the following:
- Twisting moment required to produce yielding in (kg. m).
  - Twist angle at yielding in (degrees).
  - The total energy stored at yielding in (kg.cm).
- c) Hardness is considered to be an important material property.
- Define three different definitions of hardness.
  - What is the importance of hardness determination?
  - What is meant by HRC 60?
  - Derive an expression for the Vickers hardness number (VHN).
  - State three applications for using micro-hardness.

**Question 4 : ( 20 marks )**

- a) Differentiate between Charpy and Izod impact testing machines in terms of:
- Maximum machine capacity
  - Specimen dimension
  - Specimen fixation
- b) A weight (**W**) falls from a 1 m height on the free end of a cantilever having a length of 1.5 m . The rectangular cross-section of the cantilever is 25 mm in width and 75 mm in height. The material made of the cantilever has a yield stress of 250 MPa and modulus of elasticity 210 GPa. Identify the value of the weight **W** to cause yielding in the cantilever using the equivalent static load method.
- c) Explain the nature of fatigue failure in bending and torsion.

مع تمنياتنا بالتوفيق و النجاح

د. حنفى هندأوى



W<sub>0</sub>

Course Title: Eng. Mathematics (2B)  
Date: June, 21 2017 (2<sup>nd</sup>-term)

Course Code: PME1207  
Allowed time: 3 Hrs

Year: 1<sup>st</sup> Mechanical Eng. (No. 350)  
No. of Pages: (1)

Answer the following questions

**QUESTION NO. 1 [60 MARKS]**

i) Graph and expand the function

$$f(x) = \begin{cases} 1, & \text{if } |x| < 1 \\ 0, & \text{if } 1 \leq |x| < 2 \end{cases}$$

in Fourier series for  $f(x+4) = f(x)$ .

[20 Marks]

ii) Using L.T., solve the D.E.,  $y'' + y = u(t-1)\delta(t)$ ,  $y(0) = y'(0) = 1$ .

[20 Marks]

iii) Using L.T., solve the I.E.,  $f(t) + 2 \int_0^t f(u) \cos(t-u) du = 4e^{-t} + \sin t$ .

[20 Marks]

**QUESTION NO. 2 [40 MARKS]**

i) Discuss the stability of a Mechanical system represented by the following D.E systems,

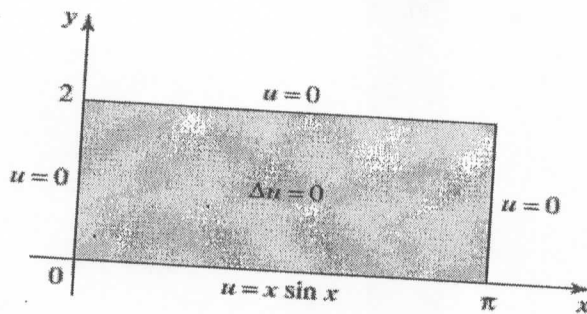
$$x' = 4x - 2y + 2u(t-1), \quad y' = 3x - y + u(t-1), \quad x(0) = y(0) = 0.$$

[20 Marks]

ii) The following diagram is showing a rectangular region  $0 < x < \pi$ ,  $0 \leq y \leq 2$ , subjected to the temperature on the side  $0 \leq x \leq \pi$ ,  $y = 0$ , being  $u(x,0) = x \sin x$ , and the temperature on the other three sides being maintained at  $u = 0$ . Find the steady state temperature distribution  $u(x,y)$  under the mentioned boundary conditions if

$$\Delta u = u_{xx} + u_{yy} = 0, \quad 0 \leq x \leq \pi, \quad 0 \leq y \leq 2,$$

[20 Marks]



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All Best Wishes

Course Examination Committee and Course Coordinator

Dr. Eng. Mohamed Elborhamy





Question - 4		13 points (3+10)
[A]	Write down the mesh current equations in a <u>matrix form</u> for the following circuit (don't solve the equations).	
[B]	Using Nodal analysis to determine the following: a) the capacitor voltage and b) the current in 30V source	

Question - 5		19 points (9+10)
[A]	For the circuit shown in Figure a) Find $R_L$ for maximum power transfer. b) Find the maximum power transfer to $R_L$ .	
[B]	For the circuit shown in Figure a) Determine the active, reactive, apparent power and power factor for each branch. b) Determine the total number of watts, the total number of VAR, the total number of VA and the input power factor. c) Sketch the power triangle. d) Find the source current.	

Question - 6		6 points (6×1)
Choose the correct answer		
[1]	For charging a battery of voltage $E$ from ac source of voltage $V_m$ using bridge rectifier a) $V_m \geq E$ b) $V_m \leq E$ c) $V_m > E$ d) $V_m < E$	
[2]	The Peak Inverse Voltage (PIV) of the diode in center-tap full-wave rectifier is ..... that of bridge rectifier. a) equal      b) double      c) half	
[3]	For bipolar transistor operates as an amplifier, the ..... a) input junction is forward and the output junction is forward. b) input junction is forward and the output junction is reverse. c) input junction is reverse and the output junction is forward.	
[4]	The current gain $A_i$ in common emitter bipolar transistor is equal ..... a) 1      b) $\beta$ c) $\beta + 1$	
[5]	The power factor at maximum power transfer condition is ..... a) unity      b) lag p.f.      c) lead p.f.	
[6]	The value of $V_{CE}$ in Fig. is ..... volt. a) 8.6      b) 3      c) 4.17      d) -3	

Wish you all the best

Dr. Fayza Saafan and Dr. Sherif Dabour