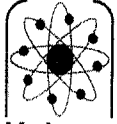


C-17/11C

اولى ميكاينيكس مادة @ كورس



Helwan
University

Department:	Mechanical Engineering.		
Course Title:	Electrical Engineering		
Academic Level:	1 st Year B. Sc.	Semester:	First Term 2015 / 2016
Course Code:	POW 1113	Total Mark:	90 marks
Instructor(s):	Dr. M. Idres and Dr. Mustafa M. Hassan		
Date:	20/1/2016	Time Allowed:	3 Hours



Faculty of
Eng. - Helwan

Answer the following questions

Question (1) (20 marks)

- (A) Describe the Speed Control Methods of a DC Motors.
- (B) What are the Methods of Starting of DC Motor?
- (C) A 120 V, dc separately excited motor drives a constant-torque load at a speed of 800 rev. /min. The armature resistance is 2Ω and field resistance is 150Ω . The motor draws armature current of 9 A.
- Calculate the E , $K \phi$, load torque, starting torque, and no load motor speed and draw torque speed characteristics.
 - Assume that to the armature voltage is reduced by 20 %. And load torque is decreased by 10 % Calculate the new armature current, new motor speed and draw new torque speed characteristics.

Question (2) (20 marks)

- (A) *Explain*, with *sketch*, how does a three phase source produce a rotating magnetic field in three phase induction Motor?
- (B) *Explain*, with *sketch*, the theory of operation of 3 phase induction Motor?
- (C) A 460-V, 1760 rpm, three-phase induction motor has $S_{Max} = 0.3$ Find:
- The synchronous speed.
 - The rated slip .
 - The frequency of the supply.
 - The speed at Max torque.
- (D) A 420V, 60Hz, three-phase induction motor, runs at 1746 rpm. , If the motor is operated at 350 V, 50Hz, and load toque is increased by 10%. Determine : The new speed and draw torque speed characteristics.

Question (3)

(20 marks)

(A) A 4 kVA, 220/48 V, 50 Hz, single-phase transformer

The transformer delivers 2 kW to a load of 0.8 p.f. lag .

Assume ideal Transformer (neglect all losses)

Compute the primary the secondary Currents at this load

(B) What happen if a primary voltage is 220 V DC instead of 220 V AC? Why?

(C) A Single Stack Variable Reluctance Stepper Motor, 3 phase, has 12 teeth on the rotor Determine:

1- Proper value of stator teeth (N_s), Step angle (θ)

2- Rotor speed at excitation frequency 100 Hz.

(D) A four-Stack, Stepper Motor has 12 teeth on the rotor. Determine the number of stator teeth and step angle. Also obtain the excitation frequency to obtain a speed of 250 rpm.

Question (4)

(30 marks)

(A) For the circuit shown in Figure (A), find the currents I_x , I_y and I_z using Nodal Analysis, Mesh Current Method and Kirchoff's Laws

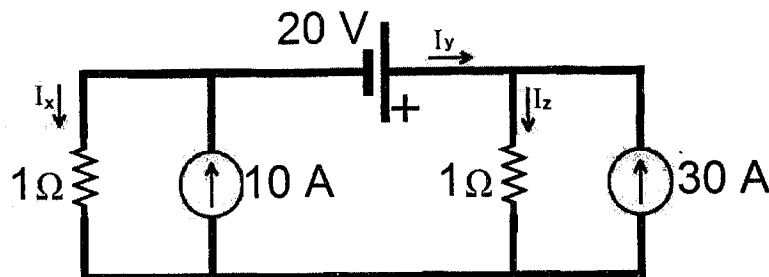


Figure (A)

(B) For the circuit shown in Figure (B), find the currents I_1 , I_2 and I_3

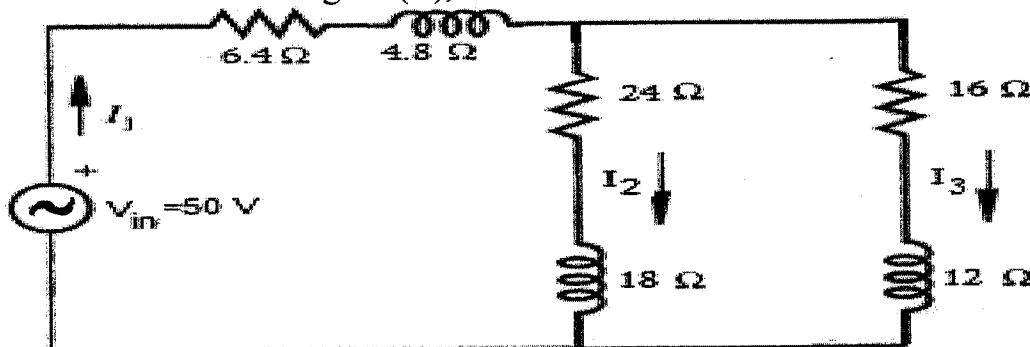

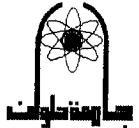


Figure (B)

(C) For the circuit shown in Figure (B), find the currents I_1 , I_2 and I_3 if the supply voltage is 50 V DC instead of 50 V AC.

 كلية الهندسة بطلوان	Dept/Division : Mechanical Engineering Academic level: 1st Semester: First 2015/16 Course code & title: (MEC 1112) PRODUCTION ENGINEERING Instructor: Prof. Dr. Osama Monier Dawood, Asst. Prof. Reham Reda and Asst. Prof. Mohamed Abdallah Bhlol Total mark: 120 marks	 جامعة أسيوط
Time allowed: 3 hrs		

الامتحان في صفتين

Answer all the following questions

Welding Technology:

Q1: [25 Marks]

- a) Define the following welding terms: (flux- deposit metal- filler material- weld pool - fusion zone - HAZ). **(6 marks)**
- b) What are the main differences between the following welding processes:
(SMAW-GMAW- GTAW) **(9 marks)**
- c) Explain with sketches the suitable welding technique used in: **(10 marks)**
- Welding of thermoplastics - Welding of heavy sections (thick plates) of mild steel

Q2: [15 Marks]

- a) What is the friction stir welding (FSW), and how it differs from friction welding? **(5 marks)**
- b) List the advantages and disadvantages of solid state welding. **(5 marks)**
- c) What are the main functions of the flux coatings in SMAW. **(5 marks)**

Q3: [20 Marks]

- a) Explain with sketches the differences between the following welding defects:
- Slag inclusions and Gas porosity - Incomplete fusion and incomplete penetration
- Under bead crack and lamellar tearing **(6 marks)**
- b) Describe with sketches the following non-destructive testes for welding defects:
- Liquid Penetrate inspection - Radiographic inspection **(8 marks)**
- c) List with sketches the different types of submerged arc welding. **(6 marks)**

Casting Technology:

Q4: [50 marks]

- a) Choose the correct answer: **(12 marks)**
1. Sand casting process is one of ----- casting processes.
(a) continuous (b) permanent mold (c) hot chamber (d) expendable mold

من فضلك اقلب الصفحة

Handwritten Urdu text at the top of the page, including the word "سوال" (Question) and "میں" (in).

2. Shrinkage allowance refers to the reduction in volume caused when metal -----.
(a) is given a draft angle (b) changes from liquid to solid
(c) gets oxidized in the mold (d) loses temperature in solid state
3. ----- is defined as the ability of the molding material to withstand high temperatures during pouring without fusion.
(a) Refractoriness (b) Green Strength (c) Hot Strength (d) Dry Strength
4. ----- is the strength of the sand that is required to hold the shape of the cavity when the metal in the mold is still in liquid state.
(a) Refractoriness (b) Hot Strength (c) Green Strength (d) Dry Strength
5. ----- the ability of sand particles to adhere to each other in the mold so that the constructed mold retains its shape.
(a) Refractoriness (b) Hot Strength (c) Green Strength (d) Dry Strength
6. Coarse sand molding promote -----
(a) refractoriness (b) collapsibility (c) dry strength (d) permeability
7. Core holding force depends on ----- of the molding sand.
(a) density (b) area (c) volume (d) compressive strength
8. Riser can compensate for the -----.
(a) solid shrinkage (b) machining allowance (c) liquid shrinkage (d) turbulence
9. ----- is an irregular variations in the speed and direction of flow throughout the liquid metal as it travels though the casting which causes mold erosion.
(a) Solid Shrinkage (b) Turbulence (c) Liquid Shrinkage (d) Machining Allowance
10. ----- are casting defects resulted from improper closure between cope and drag.
(a) Flash and mis-match (b) Cold shut and mis-run (c) Hot tears (d) Porosity
11. ----- may be caused when the mold and core have poor collapsibility.
(a) Flash and mis-match (b) Cold shut and mis-run (c) Hot tears (d) Porosity
12. Solidification of alloys occurs -----.
(a) below the melting point (b) at a constant temperature
(c) with high rate (d) over a range of temperatures

b) Correct the following sentences.

(8 Marks)

1. In gravity die casting, the molten metal is injected into the mold cavity at an increased pressure.
2. In lost wax casting process, the pattern itself evaporates when the liquid metal is poured on it.
3. In continuous casting process, horizontal machine is preferred for producing rings.
4. Mechanical properties can be improved by getting coarse grain structure during solidification through reducing the cooling rate which in turn increases the nucleation rate and decreases the growth rate.
5. In some casting process, we have to preheat the mold in order to increase the cooling rate; hence avoid the blowholes defect.

c) State (with drawing) the different stages of:

(30 Marks)


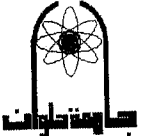
1. Shell Mold Casting
2. Investment Casting.
3. Continuous Casting.

Q5: Casting Design. [10 Marks]

If it is required to cast steel slab with dimensions 25x25x5 cm using sand casting process. Determine the following:

- (A) Riser design, let riser height equal to its diameter.
- (B) Sketch the mold before pouring and give the names of each part.

With best wishes

 <p>كلية الهندسة بطوان</p>	<p>Dept/Division : Mechanical Engineering Academic level: First Semester: First 2015/16 Course code & title: GEN1114 Technical Report Writing Instructor: Drs ;Azza Barakat, Morcos Ghobrial, Hussien Abdel Moneam Total mark: 40 mark</p>	 <p>جامعة اسيوط</p>
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- **Students must follow the rules of “Technical Report Writing” through answering all questions.**
- **Answer all questions.**

Question (1) [10 Marks]

- What are the most commonly used **Patterns of organization** in technical report writing. Describe in details the features of the **Listing pattern**?
 - Show the main contents of the **Application letter for admission**?
 - What is the purpose of the **Abstract**? Mention its main contents of **information**.
-

Question (2) [10 Marks]

- Illustrate steps of the **Full form report** for stating problem.
 - Draw a diagram to show the main steps of the **Writing process** for the technical report writing? What are the questions one should fulfill through the stage of “**Draft the document**”?
 - What are the specific guidelines used to create effective **Bar charts**.
-

Question (3) [10 Marks]

- What are different types of **letter format**? Sketch one of them showing the main parts of letter.
- Define “**Page Design**” and state the sources of “**white spaces**”. Support your answer with drawings.

- c) Discuss in details the term “**Proofreading**”. Give two examples for **Homophones words** and put each of them in a sentence?
-

Question (4) [10 Marks]

- a) Sketch the general format of the **Memorandum** (Memo)? Then show the main contents of “ **Progress report** ”.
- b) What are the **Fundamental problems** facing the technical report writers? Discuss in details any two of them.
- c) Show the structure and contents of: **Heading section** for the long informal report and **Title page** for the formal report.
-

Good Luck

2015/1/18 (ع. 2015) ل. 2015

Faculty of Engineering

First year

Code symbol: Gen 1111

Exam time: three hours



Department: Mechanics

Subject: Mathematics 2

January exam for 2015/2016

Total Marks: 70 Marks

Answer all the following questions:

1. a) Find the local extrema and saddle points of

$$f(x, y) = x^3 + y^3 - 3x^2 - 6y^2 - 9x \quad [8 \text{ marks}]$$

b) Find the mass of the lamina that occupies the region **D** bounded by $x = y$, $x = 2$, $y = 0$

where the density $\rho(x, y) = 2ye^{x^3}$. [6 marks]

2.a) Show that $I = \int_C (3x^2yz + 6x) dx + (x^3z - 8y) dy + (x^3y + 1) dz$ is independent of the path of integration and evaluate it from A (1,2,4) to B (2,1,3). [8 marks]

b) Find the volume inside the paraboloid $z = 9 - x^2 - y^2$ and outside the cylinder $x^2 + y^2 = 4$. [6 marks]

3. a) Verify Green theorem for $\oint_C xy dx + x^2 dy$ where C is the closed path bounded by the curves $y = x^2$ and $y = x$. [8 marks]

b) Use the Divergence Theorem to find the flux $\iint_S \vec{F} \cdot d\vec{s}$ of the vector field $\vec{F} = 7x\vec{i} - z\vec{k}$, across the closed surface S, where S is the sphere $x^2 + y^2 + z^2 = 4$. [6marks]

4. Solve the following first order differential equations:

a) $\cos^2 x \frac{dy}{dx} = y + 3$ [3 marks]

b) $\frac{dy}{dx} = \frac{2xy + 3y^2}{x^2 + 2xy}$ [3 marks]

c) $(2xy + 6x)dx + (x^2 + 3y^2)dy = 0$ [4 marks]

d) $x \frac{dy}{dx} + y = 3x^2$ [4 marks]

5. a) Find the general solution of the following second order differential equation:

$$y'' - 3y' + 2y = 4x^2 \quad [6 \text{ marks}]$$

b) Use the Laplace transform to solve the following IVP:

$$\frac{d^2x}{dt^2} - 3\frac{dx}{dt} + 2x = 2e^{3t}, \quad x(0) = 5, \quad x'(0) = 7 \quad [8 \text{ marks}]$$

With My Best wishes

Dr. Ahmed Elbably