المستوى الثانى

علوم المواد

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION OF (LEVEL TWO) STUDENTS OF PHYSICS			
	COURSE TITLE:	**Mathematical physics 2**		COURSE CODE: PH 2262
DATE:	5\6\2017	FINAL EXAM	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions:

First question:- (25 **Marks)**

(i) Observe that y = x is a solution of

$$y'' - [(x + 2)/x]y' + [(x + 2)/x^2]\, y = 0$$

And solve $y'' - [(x + 2)/x]y' + [(x + 2)/x^2]\, y = x\, e^{x}$

(ii) Solve $y'' - 5y' + 6y = x^2 e^{3x}$

Second question:- (25 **Marks)**

Solve (i) $y''+3y'+2y = e^{x} - 3$

(ii) $\Gamma(1/3)\,\Gamma(2/3) = ??$

(iii) $\beta(x,y)$ at x=4, y=7

Third question: - (25 **Marks)**

Prove that, $\Gamma(x+1) = x\,\Gamma(x)$

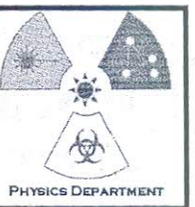
Find, $\int_0^1 x^7(1-x)^8\, dx$, $2\int_0^{\pi/2} sin^7(x)cos^8(x)\, dx$

Fourth question:- (25 **marks)**

(i) Write about Angular momentum operators

(ii) find, $x^2T'' + xT' + (x^2-1/4)T = 0$

EXAMINERS	DR. Atef Elbendary
	أطيب التمنيات بالتوفيق

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	FINAL EXAM. FOR MATERIALSCIENCE(LEVELTWO)		
	COURSE TITLE: **Mechanical Properties**	COURSE CODE: MS2232	PHYSICS DEPARTMENT
DATE: 24/5/2017	SEMESTER:TWO	TOTAL ASSESSMENT MARKS: 100	TIME: 2 HOURS

Answer the following questions:

Question [1] : (20 Mark)

Put (√)(1 Mark) or (X) (2 Marks) for the following and then correct the false:

a-The response of a material to applied forces depends on the type and nature of the bond and the structural arrangement of atoms, molecules or ions.

b-Pure shear: Normal Stresses in 3 directions; no Shear Stress.

c-Directed Stress: Stress that varies with direction.

d-Ultimate tensile strength: the practical value of the proportional limit; found using the 0.2% offset rule.

e-Infinitesiml Strain: Strain larger than a few percent.

f-In brittle materials-little plastic deformation and low energy absorption before fracture.

g-Ductility is a fundamental property of materials.

h-Resilience is a measure of the ability of a material to absorb energy up to fracture.

i-Properties of twinning : small amount of deformation when compared with slip.

j-Crack propagation is fast Propagates nearly parallel to direction of applied stress.

k-Brittle fracture is preferred in most applications.

l-The dislocation energy increases linearly with the Burgers' vector $\bar{b}$.

m-As temperature increases a brittle material can become ductile.

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Question [2] : (30 Mark)

Write short notes about the following:

(i) -Stress - Strain Curve. **(10 Marks)** & (ii)- Basic deformation types for load carrying materials. **(10 Marks)** & (iii)-Modulus of Rigidity. **(10 Mark**

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Question [3] : (26 Mark)

a-Explain the following: (10 Mark)

-Plastic deformations in polycrystalline metals.

b-Describe the following Figures: (16 Mark)

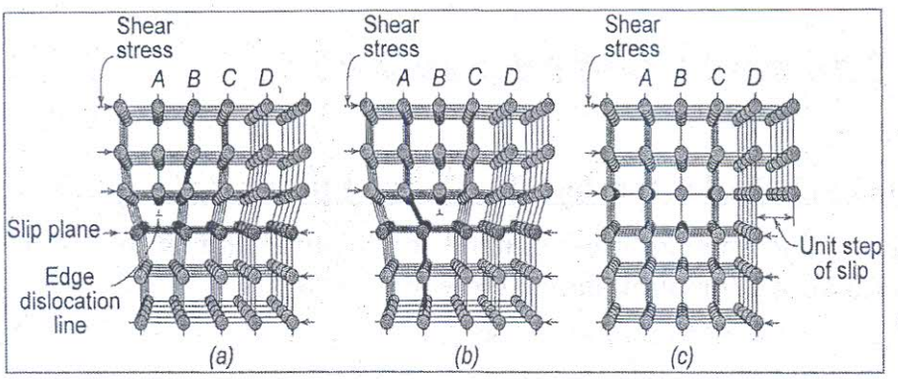

Fig.1

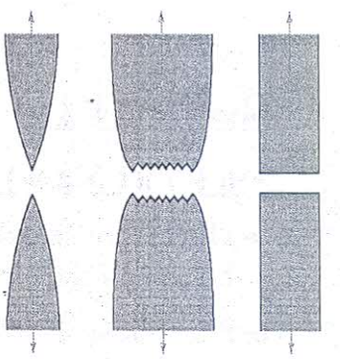

Fig.2

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Question [4] : (24 Mark)

Problems:

1-(a) A 10-mm-diameter Brinell hardness indenter produced an indentation 2.50 mm in diameter in a steel alloy when a load of 1000 kg was used. Compute the HB of this material.

(b) What will be the diameter of an indentation to yield a hardness of 300 HB when a 500-kg load is used? (6 Marks)

2-A 2kg mass is hung from a steel wire of original length 2m and diameter 0.64mm. The extension produced is 0.60mm. Calculate Young's modulus for steel. ($g=10m/s^2$). (6 Marks)

3-Compute the strain-hardening exponent n for an alloy in which a true stress of 50,000 psi produces a true strain of 0.08; assume a value of 140,000 psi for K. (6 Marks)

4-A 5.00-cm cube of gelatin has its upper surface displaced 1.00 cm by a tangential force 0.500 N. What is shear modulus of this substance? (6 Marks)

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Examiner	Dr. Samy El-Attar.

Good luck

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