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Roll No. 0601

FIRST SEMESTER **B.Tech. (GROUP A&B)**

MID SEMESTER EXAMINATION ***September-2012***

AP-103 APPLIED PHYSICS-I

Time: 1Hour 30 Minutes ***Max. Marks : 20***

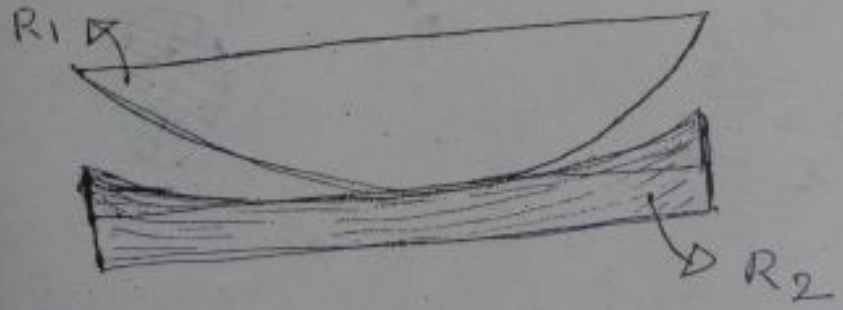
Note : Answer *ALL* questions.
Assume suitable missing data, if any.

1 A soap film of 5×10^{-5} cm thick is viewed at an angle of 35° to the normal. Find the wavelengths of light in the visible spectrum which will be absent from the reflected light. (μ=1.33) 2

2 Two beams of light having intensities I and 4I are made to interfere to produce a fringe pattern on a screen. The phase difference between beams is $\frac{\pi}{2}$ at a point A and π at a point B. Find the difference between the resultant intensities at A and B. 2

3 Show that the diameters of Newton rings when two curved surfaces as shown in the following figure with radii R_1 and R_2 are placed in contact are related by the equation.

$$\left(\frac{1}{R_1}-\frac{1}{R_2}\right)=\frac{4n\lambda}{d_n^2}$$



2

4 A glass microscope lens (μ=1.50) is coated with magnesium fluoride (μ=1.38) film to increase the transmission of normally incident yellow light (λ=5800A°). With what minimum thickness, the film should be deposited on the lens. 2

5 In Michelson interferometer 200 fringes cross the field of view of the telescope, when the movable mirror is moved through 0.0589 mm. Calculate wavelength of light used.

2

6 A space craft is moving relative to the earth. An observer on the earth finds that, between 1 PM and 2 PM according to her clock, 3601 seconds elapse on the spacecraft's clock. What is the spacecrafts speed relative to the earth?

2

7 A stationary body explodes into two fragments each of mass 1.0 kg that moves apart at speeds 0.6C relative to the original body. Find mass of the original body.

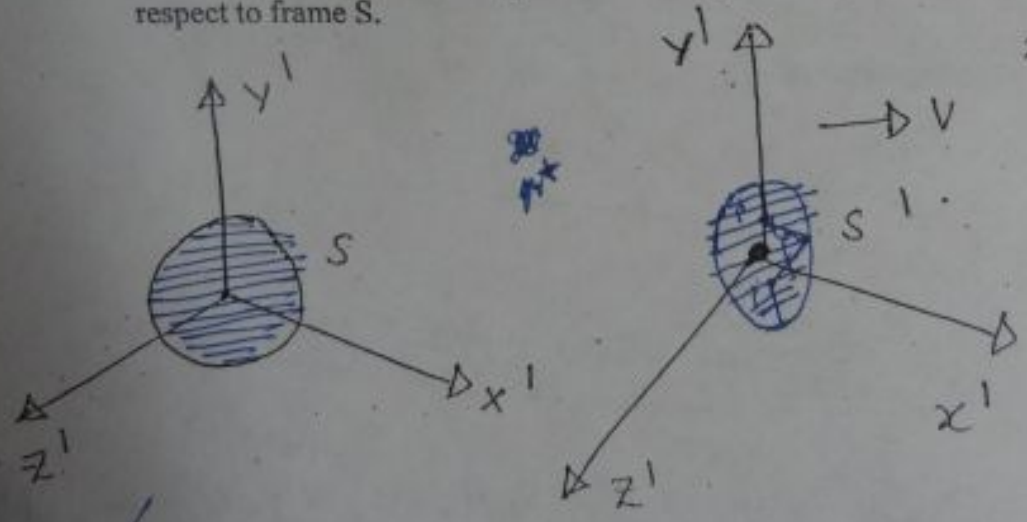
2

8 Spacecraft Alpha is moving at 0.90 C with respect to the earth. If space craft Beta is to pass Alpha at a relative speed of 0.50C in the same direction, what speed must Beta have with respect to the earth.

2

9 Find the shape of a circle at rest in a frame 'S' when viewed from a frame S', when S' is moving with a velocity v along x-direction with respect to frame S.

2



10 Calculate the percentage contraction of a rod moving with a velocity 0.8C in a direction inclined at 60° to its own length.

2

MID SEMESTER EXAMINATION *September-2012*

AM-101 MATHEMATICS-I

Time: 1Hour 30 Minutes *Max. Marks : 20*

Note : Answer *ALL* questions by selecting any *TWO* from each question.
Assume suitable missing data, if any.

1[a] State integral test and apply to test the convergence of infinite serie $\sum_{n=1}^{\infty} \frac{n}{(n^2+1)^2}$.

[b] Test the convergence of any two of the following infinite series.

(i) $\sum n^{lnx}$

(ii) $\frac{1}{2}x + \left(\frac{2}{3}\right)^4 x^2 + \left(\frac{3}{4}\right)^9 x^3 + \cdots\cdots\cdots\cdots + \infty, \quad x > 0.$

(iii) $\sum \frac{n^p}{(n+1)^q}, \quad (p, q > 0)$

[c] State Leibnitz's test for the convergence of alternating series and hence test the convergence of the series $\sum \frac{Cosn\pi}{n^2+1}$.

3, 3

2[a] Use Taylor's series expansion to evaluate $\sin 31°$ correct to four decimal places ($\cos 30° = 0.8660$).

[b] State Maclaurin's series expansion and hence obtain the expansion of the function $log(1 + sinx)$ up to x^5.

[c] Define absolute convergence and conditionally convergent of a series with suitable examples. 3½, 3½

3[a] Establish the formula to find the radius of curvature of $y = f(x)$ at any point (x, y) and hence find the radius of curvature of the curve $y = e^x$ at the point where it crosses the y-axis.

[b] If ρ is the radius of curvature at any point P on the parabola $y^2 = 4ax$ and S is its focus, then show that ρ^2 varies as $(SP)^3$.

[c] Prove that the curvature of a circle is constant whereas it is zero for straight line at any of its point. 3½, 3½

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FIRST SEMESTER

Roll No. 060

B.Tech. (Group B)

MID SEMESTER EXAMINATION

September-2012

EN-112 ENVIRONMENTATL SCIENCE

Time: 1Hour 30 Minutes

Max. Marks : 20

Note : Answer *ALL* questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q 1. Briefly discuss the theory of origin and evolution of earth.

Q 2. Describe the composition and environmental significance of different layers of atmosphere.

Q 3. Explain the physical and chemical characteristics of crust, mantle, and core of the earth.

Q 4. What do you understand by a sedimentary cycle? Explain the phosphorus cycle in this context.

Q 5. Define Biosphere. What are the important components of the biosphere?

Total No. of Pages 2

FIRST SEMESTER

Roll No. 06°1

B.Tech. (Group-B)

MID SEMESTER EXAMINATION

September-2012

AP/AC-114 ENGINEERING MATERIALS

Time: 1Hour 30 Minutes

Max. Marks : 20

Note : Answer any *FIVE* questions from Part-A and all questions from **Part-B**.
Use separate answer sheets for **Part-A** & **Part-B**.
Assume suitable missing data, if any.

PART-A

1. Draw the plane for miller indices (a) (121) and (b) (102) in a simple cubic unit cell. 2

2. In an orthortombic unit cell with a:b:c = 1:2:3, the magnitude of 'a' is 2 A°. What are the intercepts in A° of a plane of miller indices (230)? 2

3. Derive the kinetic energy of free electrons as a function of their wave number. 2

4. Plot the Fermi Dirac function f(E) versus the energy at room temperature T = 300 K. If E_F = 5eV, determine the energy value at which f(E) = 0.5.
[Given KT = 0.025 eV at room temperature]. 2

5. A uniform silver wire has a resistivity $1.54\times10^{-8}\Omega$m at room temperature. Calculate the collision time and drift velocity if there are 5.8×10^{26} conduction electrons/m^3 of the metal. 2

6. An element of atomic weight 60 has density 6.23 gm/cc. What is the radius of its atom if it has FCC structure? 2

PART-B

1[a] Explain the effects of the following alloying elements in steel
(i) Co (ii) Cr 2x2=4

OR

Write important manufacturing properties and applications of high carbon steel. 4

[a] Give composition, properties and applications of the following engineering materials:- 2x3=6

(i) Stellite

(ii) Gun metal

(iii) Duralumin

OR

Name 3 main classes of super alloys and describe their key features and applications. 6

Total No. of Pages 1

Roll No. DGO

FIRST SEMESTER **B.Tech. (GROUP-B)**

MID SEMESTER EXAMINATION ***September-2012***

ME-115 BASIC MECHANICAL ENGINEERING

Time: 1Hour 30 Minutes ***Max. Marks : 20***

Note : Answer any ***TWO*** questions from each part.
Answer all the questions from ***PART-A*** and *PART-B* at one place.
Assume suitable missing data, if any.

PART-A

1[a] What is a thermodynamic system and explain various classes of thermodynamic system. 2

[b] Describe path function and point function. 1

[c] Explain various types of thermodynamic equilibrium. 2

2 Describe the followings:

[a] Property of a thermodynamic system

[b] Type of property

[c] Quasi static process

[d] Zeroth law of temperature

[e] Ideal gas relations 5

3[a] Describe the expression for work done (i) at constant pressure (ii) at constant volume (iii) at the process in which PV = constant. 3

[b] Explain first law of thermodynamics for a closed system under going a change of state. 2

PART-B

1[a] Explain with diagram of gating system of casting. 2½

[b] List out properties of moulding sand. 2½

2 Define pattern and discuss about types of pattern and also discuss about various allowances of pattern. 5

3 Write short notes on:

(i) Chills and Chap lets (ii) Core-print (iii) Parting line

(iv) Runner (v) Mould 5

Total No. of Pages 1 *Roll No. ....*

FIRST SEMESTER **B.Tech. (Group-B)**

MID SEMESTER EXAMINATION ***September-2012***

CO-116 PROGRAMMING FUNDAMENTALS

Time: 1Hour 30 Minutes ***Max. Marks : 20***

Note : Answer ***ALL*** questions.
Assume suitable missing data, if any.

1[a] Draw a flowchart for finding greatest of 10 numbers entered by a user. 2

[b] Explain different assignment statements in C. Explain the operations used in the statements with the help of examples. 3

2[a] Why the arguments used in function prototype are called *dummy* arguments? Explain the difference between dummy and other type of arguments used in function definition and function call. Give example. 2½

[b] Write different types of array declaration with initialization. When the size of the array is optional, give examples. 2½

OR

Explain the syntax of printf and scanf statements.

3[a] Write a program to find the sum of 10 natural numbers. 2

[b] Draw flowchart for different loops available in C language. Also, explain the difference & use of different loops. 3

4[a] Define the following (***any three***): 3

(i) Structured programming
(ii) Top-down approach
(iii) Tokens in C
(iv) Call by value 3

[b] Identify the following tokens, with justifications
(i) 51 U (ii) U51 (iii) 51.2e3 (iv) 'ABC' 2