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12/452-BT

B. Tech. (First Semester) Examination, 2012

Paper–EAS-101

(Engineering Physics-I)

Time : Three Hours] *[Maximum Marks : 50*

Note : Attempt all Sections as per instructions.

Section–A

Attempt *all* parts. Give answer of each part in about 50 words. 1×10=10

1. (i) What do you mean by inertial frame of reference ?

(ii) Is earth an inertial frame of reference ? If not, why ?

(iii) What do you mean by interference of light ?

(iv) What will happen if a little water is introduced between the lens and glass plate of Newton's ring experiment?

(v) Distinguish between Fraunhofer and Fresnel diffraction.

(vi) Show that only first order spectra is possible if width of grating element is less than twice the wavelength of light.

(vii) What is pumping?

(viii) Define specific rotation.

(ix) What is V-number of fibre?

(x) Define attenuation of an optical fibre.

Section-B

Attempt *all* questions. Give answer of each question in about 200 words. 5×5=25

2. Derive Lorentz transformation equation.

Or

6. A body is moving with velocity v has a mass m. Show that:

$$m = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}.$$

3. Discuss the phenomenon of interference of light due to thin films in reflected light and find the condition of maxima and minima.

Or

Two slits in Young's interference experiment have width in the ratio 1 : 25. Find the ratio of intensity at the maxima and minima in the interference.

4. What is meant by the resolving power of an optical instrument ? Explain Rayleigh's criterion for limit of resolution.

Or

Two spectral lines have wavelength λ and $\lambda+d\lambda$ respectively. Show that if $d\lambda \ll \lambda$, their angular separation $d\theta$ of grating spectrometer is given by :

$$d\theta = \frac{d\lambda}{\sqrt{\left(\frac{e+d}{n}\right)^2 - \lambda^2}},$$

where $(e+d)$ is grating element and n the order at which the line are observed.

5. Explain the phenomenon of double refraction in calcite crystal. Describe the construction and working and use of Nicol prism.

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Or

What are Einstein coefficients A and B ? Deriv relation between them.

6. Explain acceptance angle and acceptance cone of an optical fibre. What do you mean by numerical aperture ? Derive an expression for it.

Or

A glass clad fibre is made with core glass of refractive index 1.50 and cladding is doped to give a fraction index difference of 0.0005. Find :

(i) The cladding index

(ii) The critical internal reflection angle

(iii) The external critical acceptance angle

(iv) Numerical aperture.

Section-C

Attempt any *two* questions. Give answer of each question in about 500 words. $7\frac{1}{2}\times2=15$

7. (a) Show that time dilation is real effect.

(b) Calculate the velocity of the rod when its length will appear 90% of its proper length.

8. What are Newto Newton's rings a the radius of the order of rings.

9. Discuss the a single slit successive

10. What d the H achiev

11. Wha rec

8. What are Newton's rings ? Why the centre of the Newton's rings appears dark ? Derive an expression for the radius of the *n*th dark rings width decrease with the order of rings.

9. Discuss the phenomenon of Fraunhofer diffraction at a single slit and show that the relative intensities of successive maximum are nearly :

$$1 : \frac{4}{9\pi^2} : \frac{4}{25\pi^2} : \frac{4}{49\pi^2} \ldots\ldots\ldots\ldots$$

10. What do you mean by population inversion ? Describe the He–Ne laser. How the population inversion achieved in He–Ne laser ?

11. What is holography ? Discuss construction and reconstruction of image in hologram.

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B. Tech. (First Semester) Examination, 2012

Paper–EAS-102

(Chemistry-I)

Time : Three Hours] *[Maximum Marks : 100*

Note : Attempt all Sections as per instructions.

Section–A

Attempt *all* parts. Give answer of each part in about 50 words. 2×10=20

1. (i) What is bond order ? Calculate bond order in CO.
   (ii) What is degree of freedom in phase rule ?
   (iii) What is Carbene ?
   (iv) Write differences between molecularity and order.
   (v) What are Bravais lattices ?
   (vi) What is bathochromic effect ?
   (vii) Give the name of major sources of air pollutants.

(viii) What is Zeolite ?

(ix) Write number of pentagons and hexagons in C_{60}.

(x) What is threshold energy of a reaction ? Is it different from activation energy ?

Section-B

Attempt *all* questions. Give answer of each question in about 200 words. $10 \times 5 = 50$

2. Determine the bond order of N_2, N_2^+ and N_2^- species.

Or

Discuss the radius ratio rule and its applications.

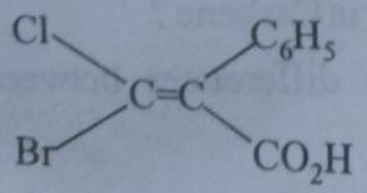
3. Derive the rate expression for second order reaction :

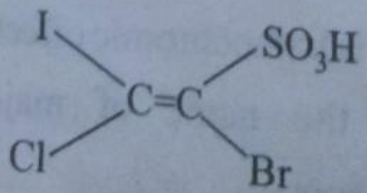
$$2A \longrightarrow \text{Product.}$$

Or

Derive the expression for half-life-time and average lifetime, for a radioactive disintegration reaction.

4. Specify the configuration (E or Z) :





Or

What are enantiomers ? Give one example.

5. Discuss the mechanism of $S_{N}1$ –reaction by suitable example.

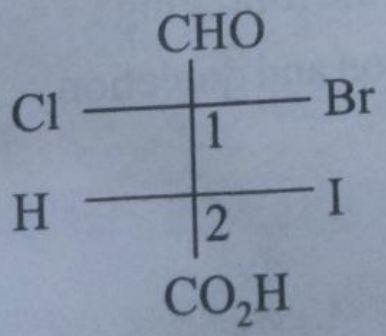
Or

Determine the number of unit cell in 100 gram of crystalline substance, if edge length of cubic lattice is 2.88Å. (Å≡Angstrom and density is 7.20 gm cm^{-3}).

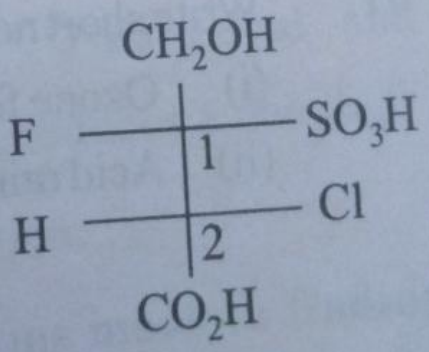
6. What is conducting polymer ? Discuss with example.

Or

Specify the absolute configuration (R, S) of carbon chiral centres (C_1 & C_2) in following structures (i) and (ii) :



(i)



(ii)

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Section-C

Attempt any *two* questions. Give answer of each question in about 500 words. $15\times2=30$

7. Discuss one process of softening of hard water.

8. What is electrode potential ? Evaluate E.M.F. of electrode concentration cell or $\underset{\text{Sol.}a_1}{Zn|ZnSO_4}\,||\,\underset{\text{Sol.}a_2}{CuSo_4}\,|\,Cu$ cell.

9. Discuss Beckmann rearrangement.

10. Derive relation :

$$\log_{10}\left(\frac{K_2}{K_1}\right)=\frac{E_a}{2.303R}\left(\frac{1}{T_1}-\frac{1}{T_2}\right).$$

Also calculate E_a in Joule, if rate constant of reaction increases two fold, on increasing temperature from 27°C to 37°C.

11. Write short notes on the following :
    (i) Ozone formation and depletion
    (ii) Acid rain.

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12/456-BT

B. Tech. (First Semester) Examination, 2012

Paper–ECS-101

(Computer Concept & Programming in C)

Time : Three Hours] *[Maximum Marks : 100*

Note : Attempt all Sections as per instructions.

Section–A

Attempt *all* parts. Give answer of each part in about 50 words. 2×10=20

1. (i) Write any one definition of operating system, also draw the unix architecture.

(ii) Write an algorithm to find the area of rectangle.

(iii) Which command in UNIX is used to see the directly in which you are presently working ? Write the complete syntax.

(iv) Write the important components of the digital computer.

(v) Write brief introduction of fopen and fread.

(vi) Write the basic operations of array.

(vii) Write the full syntax of while and do loops.

(viii) What is the decimal and hexadecimal equivalent of $(11010101.1101)_2$?

(ix) What are the range of data types integer, character, long and double ? .

(x) Write any four differences in high level and low level programming languages.

Section-B

Attempt *all* questions. Give answer of each question in about 200 words. $10 \times 5 = 50$

2. Write a program in C for selection sort. Also write its complexity.

Or

Write a program in C to determine whether the year is leap year or not.

3. Write a program to print all prime numbers from 1 to 300.

Or

What are the advanced features of functions ? What is call by value and call by reference ?

4. What is multidimensional array ? Write a program in C to make 3×4 matrix.

Or

Explain each and every unit of digital computer. Also explain its basic organi

(vii) Write the full syntax of while and do loops.

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(ix) What are the range of data types integer, character, long and double ?.

(x) Write any four differences in high level and low level programming languages.

Section-B

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What are the advanced features of functions ? What is call by value and call by reference ?

4. What is multidimensional array ? Write a program in C to make 3×4 matrix.

Or

Explain each and every unit of digital computer. Also explain its basic organization.

(105)

5. What is sequential search ? Write an algorithm for sequential search.

Or

Explain the switch and break statements. Explain them with a proper example.

6. What is the purpose and usage of structures ? How we declare the structure ?

Or

Write a program to count the number of words in a given text file.

Section-C

Attempt any *two* questions. Give answer of each question in about 500 words. 15×2=30

7. What is stack ? Why it is used for ? Write an algorithm for "PUSH" and "POP" functions.

8. Write a program which concatenates a string to the left of a given string.

9. What is structured programming ? What is the difference between top-down and bottom up approach of programming ?

10. Write down algorithm for all operations of linked list.

11. What are the numeric and relational operation ? Also explain mixed operands and logical operators.

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B. Tech. (F

Time : Thre

Note : A

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12/458-BT

B. Tech. (First Semester) Examination, 2012

Paper–EAS-104/EAS-204

(Professional Communication)

Time : Three Hours] *[Maximum Marks : 100*

Note : Attempt all Sections as per instructions.

Section-A

Attempt *all* parts of this question. 20

1. (a) Match the following column 'A' with column 'B' : 5

Column 'A'	Column 'B'
Amazing	Courage
Eternal	Ancient
Hop	Timeless
Primitive	Jump
Fortitude	Wonderful

(12)

(b) Give the antonyms of the following words : 5

(i) Exclude

(ii) Legitimate

(iii) Accord

(iv) Zealous

(v) Competent.

(c) Give the meanings of any five of the following homophones and use them in sentences of your own : 10

(i) Desert, Dessert

(ii) Rack, Rake

(iii) Buy, Bye

(iv) Beat, Beet

(v) Pole, Poll

(vi) Suit, Suite

(vii) Peace, Piece.

Section-B

Attempt *all* questions. Give answer of each question in about 200 words. 10×5=50

2. "Technical writing is professional writing." Explain.

Or

Write a short note on interpersonal communication.

3. What are basic requiremer
technical writing?

Or

What is the difference
technical article?

4. What are the parts of

Write a letter to S
scientific equip
lamps, 40 beak

5. How do k
communica

What do
Explain

6. Write
betwe

Bri
C
P

3. What are basic requirements of a good paragraph in technical writing ?

Or

What is the difference between a research paper and technical article ?

4. What are the parts of a report ? Explain.

Or

Write a letter to Sales Manager asking him to supply scientific equipments : 500 test tubes, 150 spirit lamps, 40 beakers and 30 burettes.

5. How do kinesics and proxemics influence communication process ? Explain with examples.

Or

What do you understand by presentation skill ? Explain various steps of presentation skill.

6. Write a paragraph bringing out the differences between aims of science and those of humanities.

Or

Bring out briefly how philosophy functions as a Comprehensive Science. (with reference to A.J. Bahm's essay 'The Mother of the Sciences').

Section-C

Attempt any *two* questions. Give answer of each question in about 500 words. 15×2=30

7. What are the various channels of communication ? Write detailed notes on the importance, advantages and limitations of any two of them.

8. Define the significance of formal proposal mentioning the divisions. What are the different types of proposals ?

9. What elements constitute the structure of a business letter ? Discuss briefly each of them.

10. Define non-verbal communication and explain various types of non-verbal communication.

11. What is a rose ? Answer the question from the point of view of:

(i) a scientist and

(ii) a litrary artist

(takes clues from Aldous Huxley's "The Language of literature and Science").

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12/459-B

B. Tech. (First Semester)

Paper : EM

(Manufacturin

Time : Three Hours]

Note : Attempt all Sections

Attempt *all* parts

50 words.

1. (i) What d

suitab

(ii) Defi

nam

(iii) De

(iv)

(v)

(vi)

(vii