B. E. Computer/EC&A/Electrical/Geomatic/First Semester/*Final*
Time: 03:00 hrs.   Full Marks: 60 /Pass Marks: 24
BSH1002: English for Technical Communication *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt ALL questions.

1(a)   Read the following text and take notes: 4

  (b)   Also, write a precis of the given text: 4

A new study published in the journal Science shows definitive evidence of organic matter on the surface of Mars. The data was collected by NASA's nuclear-powered rover curiosity. It confirms earlier findings that the Red Planet once contained carbon-based compounds. These compounds - also called organic molecules - are essential ingredients for life as scientists understand it.

The organic molecules were found in Mars's Gale Crater, a large area that may have been a watery lake over three billion years ago. The rover encountered traces of the molecule in rocks extracted from the area. The rocks also contain sulfur, which scientists speculate helped preserve the organics even when the rocks were exposed to the harsh radiation on the surface of the planet.

Scientists are quick to state that the presence of these organic molecules is not sufficient evidence for ancient life on Mars, as the molecules could have been formed by non-living processes. But it's still one of the most astonishing discoveries, which could lead to future revelations. Especially when one considers the other startling find that Curiosity uncovered around five years ago.

The rover analyses the air around it periodically, and in 2014 it found the air contained another of the most basic organic molecules and a key ingredient of natural gas: methane. One of the characteristics of methane is that it only survives a few

hundred years. This means that something, somewhere on Mars, is replenishing the supply. According to NASA, Mars emits thousands of tons of methane at a time. The level of methane rises and falls at seasonal intervals in the year, almost as if the planet is breathing it.

2(a) Locate the primary stress in the following words: 2

develop, biology, himself, hotel.

(b) Write one word having each of the following sound in the initial position: 2

$|ts|, |d|, |m|, |i|$

3. Write a manuscript of public speech on "Women Should Rule the World". 4

OR,

What do you mean by effective speaking? Briefly discuss any two fundamentals of effective speaking with illustrations.

4. Apply four levels on 'Marriage is a Private Affair' by Chinua Achebe. 8

5(a) Write an apology letter to your boss for the recent meeting you missed at work. 4

(b) Suppose that you are the secretary of Students Council of your college. Now prepare minute of the last meeting by inventing suitable agenda. 4

6. Prepare a technical proposal for establishing a new IT Company in your city. 8

OR,

A private construction company, Bharatpur, Chitwan, is looking for a few Computer Engineers. The vacancy announcement has been recently published in "The Kantipur National Daily". Write an application for the post with a functional CV. 8

7(a) What do you mean by Seminar? List out the pre-seminar activities. 4

(b) Prepare a seminar paper on "Specific Measures to Reduce Garbage Problem in Kathmandu" with a view to presenting it in a seminar organized by Kathmandu Metropolitan City. 8

8(a) Change the following as indicated in the brackets: 4

   (i) I am different than his father. (BrE)

   (ii) I've passed this test. So, I'll get my driving licence very soon. (AmE)

   (iii) What do you like to eat? (formal)

   (iv) Don't sit on the sofa now. (Polite)

(b) Change the following sentences as directed in the brackets: 4

   (i) He says to her, "Did you play volleyball?" (indirect speech)

   (ii) They shared an important message with me. (passive voice)

   (iii) If she had found me, she ------ (beat) me. (supply correct form of the verb),

   (iv) He is nothing ------ (with/from/without/to) my support. (choose correct preposition).

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PURBANCHAL UNIVERSITY
2023

B. E. Computer/Electrical/EC&A/Biomedical/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 60 /Pass Marks: 24

BSH1004: Physics *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt ALL questions.

Group A

Very short question: 4×2=8

1. Write the condition for critical damping, overdamped and underdamped condition. 2

2. Calculate the thickness of half wave plates for light of wavelength 600 nm. Given μ_o=1.554, μ_e= 1.544. 2

3. A parallel plate capacitor has plates of sides 0.08m and 0.04m. Their distance apart is 0.8mm. The dielectric constant of the medium between the plates is 4. Calculate the capacitance of capacitor. 2

4. Define displacement current. Show that when conduction current drops to zero, the displacement current also drops to zero. 2

OR

Write down the de-Broglie wave equation. Is it possible matter wave associates with material particle if the particle is in rest? 2

Group B

Short question: 7×4=28

5. What is piezoelectric effect? How is it used for the production of ultrasonics. 4

OR

Describe radiographic method in non-destructive testing. 4

Contd. ...

6. A certain process requires 10^{-6} sec to occur in an atom at rest in laboratory. How much time will this process require to an observer in the laboratory, when the atom is moving with a speed of 5×10^7 m/s. 4

7. An optical fibre has a NA of 0.20 and a cladding refractive index of 1.59. Determine the acceptance angle for the fibre in water which has a refractive index of 1.33. 4

8. A monochromatic light of wave length 5890Å is incident normally on a diffraction grating which has 6000 lines per cm. At what angle will the second order image be seen? 4

OR

Calculate the focal length of combination of lenses of focal lengths 6cm and 2cm separated by a distance 4cm. Find also the positions of principal points. 4

9. What is the average time between collisions of free electrons in a copper wire? Given: molar mass of the copper=63.5gm/mol, density of copper wire= 9000kg/m³, resistivity of copper wire= 1.7×10^{-8} Ωm and Avogadro number N_A=6.02×10²³/mol. 4

10. Write Maxwell's equations in integral form. Derive the equation 4

$$\nabla \times \vec{B} = \mu_0 \vec{J} + \mu_0 \varepsilon_0 \frac{\partial \vec{E}}{\partial t}$$

11. A beam of electrons having energy of each 3eV is incident on a potential barrier to height 4eV. If the width of the barrier is 20×10^{-10}m, Calculate the percentage in transmission coefficient of the beam through the barrier. 4

Group C

Short question: 3×8=24

12. Differentiate between compound pendulum and torsional pendulum. Derive time period of compound pendulum and show that time period is minimum when point of suspension and

oscillation are equidistance from center of gravity of the pendulum. 2+4+2

13. For interference in thin film, show that the film which appears bright in reflected light appear dark in the transmitted light. 4+4

14. Define electric quadrupole. Is it a vector quantity? Derive an expression for electric field intensity due to the quadrupole in axial line. 1+1+6

OR

Explain Hall-effect. Derive expressions for Hall voltage. 2+6

PURBANCHAL UNIVERSITY
2023

B. E. Computer/Electrical/First Semester/*Final*

Time: 03:00 hrs.   Full Marks: 60 /Pass Marks: 24

BCE1001: Fundamental of Computing Technology *(New Course)*

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt ALL questions.

Group A

Very short question: 4×2=8

1. Write about the digitizer and specify its types.

2. Define IOT. What do you mean by big data?

3. What is Interpreter? Describe processing methods of interpreter.

4. What is Machine Learning and Bitcoin?

Group B

Short question: 7×4=28

5. Classify the Computer according to basis of their uses.

6. Explain the functions of operating system.

7. Write in details about role of I/O devices in a computer system.

8. Explain the different types of guided media in data communication.

9. What is a modem? explain how it works. What is baud rate?

10. Write in details features and limitations of Windows Operating System

11. Describe the features of mesh Topology with their advantages and disadvantages.

Group C

Long question: 3×8=24

12. Explain about optical disk drive. Discuss about digital marketing.

13. Write the generations of the programming language with their characteristics.

14. What is e-commerce? Write features of the e-commerce with their Advantages and disadvantages of e-commerce.

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PURBANCHAL UNIVERSITY
2023

B.E./B. Architecture First Semester/*Final*

Time: 03:00 hrs.   Full Marks: 60 /Pass Marks: 24

BSH1001: Mathematics-I *(New Course)*

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Attempt ALL questions.   10×2=20

1. Find the radius of curvature at any point of the curve $y = \log Sin\, x$.

2. If u=x²+y²+z² show that: $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} + z\dfrac{\partial u}{\partial z} = 2u$

3. Evaluate the following limits: $\underset{x \to 0}{Lim}\ \dfrac{x\cos x - \log(1+x)}{x^2}$

4. Use Gamma function to evaluate: $\int_0^1 x^6\sqrt{1 - x^2}\,dx$

5. Prove that: $\int_0^\pi x\, f(\sin x)\,dx = \dfrac{\pi}{2}\int_0^\pi f(\sin x)\,dx$

6. Define Improper integration and evaluate: $\int_2^\infty \dfrac{dx}{1 - x^2}$.

7. Find the Volume of the solid formed by the rotation of loop about x-axis, the equation of loop is: $y^2 = x^2\,(a-x)$.

8. Identify the central conic represented by the curve and find the center of this conic: $36x^2 - 24\,xy + 29\,y^2 - 72x = 126y + 81$

9. Find the equation of tangent to the parabola $y^2=8x$ at (2,4).

10. By applying the product of vectors prove that:
    $\vec{i} \times (\vec{a} \times \vec{i}) + \vec{j} \times (\vec{a} \times \vec{j}) + \vec{k} \times (\vec{a} \times \vec{k}) = 2\vec{a}$

Group B

Attempt ALL questions.   10×4=40

11. If y = sin(msin⁻¹x) prove that:
    $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$.

12. From the given curve: $x^3 - 2x^2y + xy^2 - 3x^2 + 3y^2 + 8y = 0$. Find the possible asymptotes of the curve.

13. Prove that the sum of intercepts of the tangent to the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ upon the axis is constant.

OR,

Find the radius of curvature at origin for the curve:
$x^4 + y^2 = 6a(x + y)$

14. Apply the Leibnitz's Rule to evaluate the following integral:
$$\int_0^1 \frac{x^b - a}{\log x}\, dx$$

15. Find the entire area covered by an asteroid: $x^{2/3} + y^{2/3} = a^{2/3}$

OR,

Trace the following curve: $y = x^3 - 12x - 8$.

16. Evaluate the following double integral by changing the order of integration: $\int_0^a \int_0^{\frac{bx}{a}} \frac{x}{\sqrt{x^2 + y^2}}\, dx\, dy$

17. Through what angle must the axes be rotate to remove the term containing xy in the equation $11x^2 + 4xy + 14y^2 = 5$.

18. Find the equation of ellipse whose focus, directrix and eccentricity are: $(-1, 1)$, $x-y+3=0$, and $e = 1/2$, respectively.

OR,

If e_1 and e_2 be the eccentricities of the hyperbolas $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$ and $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = -1$ then show that $\dfrac{1}{e_1^2} + \dfrac{1}{e_2^2} = 1$.

19. Define scalar triple product. Show that:
$$[\vec{a} + \vec{b} \quad \vec{b} + \vec{c} \quad \vec{c} + \vec{a}] = 2[\vec{a}\ \vec{b}\ \vec{c}].$$

OR,

Find the set of reciprocal vectors of the vector set:
$3\vec{i} - \vec{j} - 2\vec{k}\ ;\ 2\vec{i} - 3\vec{j} + 4\vec{k}$ and $\vec{i} + 2\vec{j} + \vec{k}$

20. Find the Vector equation of line of intersection of two planes:
$3x - 6y - 2Z = 15$ and $2x + y - 2z = 5$.

PURBANCHAL UNIVERSITY
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B. E. (Computer/EC&A/Electrical/Biomedical)/First Semester/Final

Time: 03:00 hrs.   Full Marks: 60/Pass Marks: 24

BCE1001: Computer Programming (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Attempt ALL questions

Group A

Very short question: 4×2=8

1. Define logical error and run-time error with proper examples.

2. Differentiate between getch() and getchar() functions.

3. Write importance of C.

4. Write rules of naming identifiers.

Group B

Short question: 7×4=28

5. Write a program to find sum of digits of given integer entered by user.

6. Write a program to display and count prime numbers from 50 to 200.

7. Differentiate between entry controlled and exit controlled loop with examples.

8. Write a program to count number of vowels in a given sentence using function.

9. Write a program to find the sum of elements of an array of size, N using dynamic memory allocation.

10. Explain call by value and call by reference with example.

11. Differentiate between structure and union with example.

OR

Mention advantage of a data file. Write a program to copy content of one file into another.   1+3

Group C

Long question.   3×8=24

12(a) Define array. Write a program using pointer to find the difference of the largest and the smallest element of a given array of size, N.   1+5

(b) Discuss file opening modes.   2

13. Write a program to create a structure named player with data members: name, run scored, and country. Take input for 100 players and display the records on basis of their country.

14(a) Discuss any four string handling functions with their syntax.   4

(b) Write a program to draw an ellipse, a circle, a rectangle, and a square without overlap.   4

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