B.Tech. (Common for all Branches) 1st Semester

G-Scheme Examination, December–2024

WORKSHOP TECHNOLOGY

Paper-ESC-ME-102-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Q. No. 1 is **compulsory** and of short answer type. Each question carries equal marks (15 marks). Students have to attempt **five** questions in total at least **one** question from each unit.*

1. Answer the following questions briefly. 6×2.5=15

(a) Explain the objectives of plant layout in manufacturing processes.

(b) List and describe the basic hot and cold working processes.

(c) What are the advantages of using timber in carpentry and what are its common defects?

(d) Explain briefly the types of allowances associated with patterns.

(e) Describe the constituents and properties of sand.

(f) Differentiate between gas welding and arc welding processes.

Unit-I

2. Discuss the importance of industrial safety in manufacturing processes, focusing on the types of accidents, causes and methods of safety. 15

3. Explain the various types of plant layout and their respective advantages in manufacturing setting. 15

Unit-II

4. Describe the sheet metal operations, including measuring, layout marking, shearing, punching, blanking, piercing, forming, bending and joining. 15

5. Discuss the advantages of timber and the classification of metals. Explain the fitting tools and operations in detail. 15

Unit-III

6. Explain the basic steps involved in casting processes, including pattern types, sand, properties and gating system. Discuss common casting defects and their remedies. 15

7. Describe the lathe machine, its operations and CNC machining. Explain the functions of shaper and planner machines in manufacturing. 15

Unit-IV

8. Provide an introduction to welding and classify welding processes. Explain oxy-acetylene welding and resistance welding, including spot and seam welding. 15

9. Discuss arc welding techniques, including metal arc, TIG, and MIG welding. Explain common welding defects and their remedies, along with the principles of soldering and brazing. 15

Roll No. .....

27071

Value Added Course 1st Semester Examination – December, 2024

ENVIRONMENTAL SCIENCE

Paper : 23ENVX01AC01

Time : Two Hours] *[Maximum Marks : 35*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

प्रश्नों के उत्तर देने से पहले परीक्षार्थी यह सुनिश्चित कर लें कि उनको पूर्ण एवं सही प्रश्न-पत्र मिला है। परीक्षा के उपरान्त इस संबंध में कोई भी शिकायत नहीं सुनी जायेगी।

Note : Attempt *five* questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

प्रत्येक इकाई से ***एक*** प्रश्न चुनते हुए, कुल ***पाँच*** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 ***अनिवार्य*** है। सभी प्रश्नों के अंक समान हैं।

1. Write short notes on the following : $7 \times 1 = 7$

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(a) Ethical value of biodiversity
जैव विविधता का नैतिक मूल्य

(b) Air quality index
वायु गुणवत्ता सूचकांक

(c) Poaching of wildlife
वन्यजीवों का अवैध शिकार

(d) Over-exploitation of resources
संसाधनों का अत्यधिक दोहन

(e) Pollution
प्रदूषण

(f) Food Chain
खाद्य शृंखला

(g) Non- Renewable resources
गैर-नवीकरणीय संसाधन

UNIT – I

इकाई – I

2. Define sustainability and discuss the concept of sustainable development. 7

सततता को परिभाषित करें और सतत विकास की अवधारणा पर चर्चा करें।

3. Write short notes on : $3.5 \times 2 = 7$

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखें :

(i) Aquatic ecosystem
जलीय पारिस्थितिकी तंत्र

(ii) Grassland ecosystem
चरागाह पारिस्थितिकी तंत्र

UNIT – II

इकाई – II

4. Write short notes on : $3.5 \times 2 = 7$

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखें :

(i) Deforestation and over-exploitation of forest resources
वनों की कटाई और वन संसाधनों का अत्यधिक दोहन

(ii) Role of individual in conservation of natural resources
प्राकृतिक संसाधनों के संरक्षण में व्यक्ति की भूमिका

5. Discuss the environmental effects of the following : $3.5 \times 2 = 7$

निम्नलिखित के पर्यावरणीय प्रभावों पर चर्चा करें :

(i) Agriculture
कृषि

(ii) Mineral resources extraction
खनिज संसाधनों का निष्कर्षण

UNIT – III

इकाई – III

6. Explain in-situ and ex-situ conservation of biodiversity. 7

जैव विविधता के इन-सीटू और एक्स-सीटू संरक्षण की व्याख्या करें।

7. Write short notes on : $3.5 \times 2 = 7$

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखें :

(i) Habitat loss

आवास की हानि

(ii) Endemic and exotic species

स्थानिक और विदेशी प्रजातियाँ

UNIT – IV

इकाई – IV

8. Discuss the management of the following types of disaster : $3.5 \times 2 = 7$

निम्नलिखित प्रकार की आपदाओं के प्रबंधन पर चर्चा करें :

(i) Earthquake

भूकंप

(ii) Cyclone

चक्रवात

9. Give the definition, cause, effects and control measures of the following : $3.5 \times 2 = 7$

निम्नलिखित की परिभाषा, कारण, प्रभाव और नियंत्रण के उपाय बताएँ :

(i) Thermal pollution

तापीय प्रदूषण

(ii) Noise pollution

ध्वनि प्रदूषण

B.Tech. (Common for all Branches) 1st Semester
G-Scheme Examination, December–2024

CHEMISTRY-I

Paper-BSC-CH-101-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory.*** *Attempt* ***one*** *question from each unit. All questions carry equal marks.*

1. (a) Write mathematical representation of Schrodinger Wave Equation and physical significance of Ψ^2.

(b) What are various units to measure hardness? Also mention the relationship between them.

(c) Why IR spectroscopy is called vibrational spectroscopy?

(d) Define chirality and chiral carbon with the help of a suitable example.

(e) Define Ligand on the basis of Crystal Field Theory. Give example of two ligands.

(f) Convert Acetyl chloride and Acetic anhydride into Aspirin.

15

[P.T.O.

Unit-I

2. (a) Discuss important points of Molecular Orbital Theory. 5

(b) Explain crystal field splitting in Octahedral complexes. 5

(c) On the basis of impurities added, explain the types of Intrinsic semiconductors. 5

3. Explain the following terms: 15

(i) Screening effect

(ii) Electronegativity

(iii) Polarising power and polarisability

Unit-II

4. (a) Differentiate the following : 10

(i) SN1 and SN2 reactions

(ii) Enantiomers and Diastereomers

(b) Write the oxidation and reduction reactions of carbonyl compounds. 5

5. Write short note on the following : 15

(a) Cyclisation reactions

(b) Structural isomerism in organic compounds

(c) Conformations of cyclohexane

Unit-III

6. (a) Suggest a suitable way to determine hardness of given water sample. Explain its principle and procedure. 7

(b) Discuss the terms "Exhaustion & Regeneration" with respect to Zeolite and Demineralisation process. 8

7. (a) Explain various types of Intermolecular forces present in molecules with at least one example of each. 8

(b) Define Corrosion. Discuss various environmental factors affecting the process of corrosion. 7

Unit-IV

8. Write a short note on the following: 15

(a) Magnetic Resonance Imaging

(b) Types of Vibrations in IR spectroscopy

(c) Upfield and Downfield of NMR signal

9. (a) Explain the principle and applications of UV spectroscopy. 7

(b) Give reason for the following: 8

(i) Splitting of NMR signal

(ii) TMS taken as standard in NMR spectroscopy

Roll No. .....

97756

Value Added Courses 1st Sem. (For All Four Year UG/5 Year Integrated Programs) w.e.f. 2023-24 as Per (NEP-2020) Examination – December, 2024

DIGITAL AND TECHNOLOGICAL SOLUTIONS

Paper : 23CSAX01VA01

Time : Three hours] *[Maximum Marks : 35*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

प्रश्नों के उत्तर देने से पहले परीक्षार्थी यह सुनिश्चित कर लें कि उनको पूर्ण एवं सही प्रश्न-पत्र मिला है। परीक्षा के उपरान्त इस संबंध में कोई भी शिकायत नहीं सुनी जायेगी।

Note : Attempt ***five*** questions in total, selecting *one* question from each Section. Question No. 1 is ***compulsory.***

प्रत्येक खण्ड से ***एक*** प्रश्न का चयन करते हुए, कुल ***पाँच*** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 ***अनिवार्य*** है।

1. (a) What is difference between Internet and WWW ? 1.5

इंटरनेट और WWW में क्या अंतर है ?

(b) How Artificial Intelligence and Machine Learning are related ? 1.5

आर्टिफिशियल इंटेलिजेंस और मशीन लर्निंग कैसे संबंधित हैं ?

(c) Explain Unified Payment Interface briefly. 1.5

यूनिफाइड पेमेंट इंटरफेस को संक्षेप में समझाइए।

(d) What is an e-wallet ? 1.5

ई-वॉलेट क्या है ?

(e) What is Operating System ? 1

ऑपरेटिंग सिस्टम क्या है ?

SECTION – A

खण्ड – अ

2. (a) What is Flowchart ? Explain the different symbols of Flowchart. 3

फ्लोचार्ट क्या है ? फ्लोचार्ट के विभिन्न प्रतीकों की व्याख्या कीजिए।

(b) Explain the different ICT tools that are useful for Education. 4

शिक्षा के लिए उपयोगी विभिन्न आईसीटी उपकरणों की व्याख्या कीजिए।

3. Draw the block diagram of a computer and explain its different components. 7

कंप्यूटर का ब्लॉक डायग्राम बनाइए और इसके विभिन्न घटकों की व्याख्या कीजिए।

SECTION – B

खण्ड – ब

4. Write short notes on : 2 + 2 + 3

निम्न पर संक्षिप्त टिप्पणियाँ लिखिए :

(a) Web Browsers

वेब ब्राउजर्स

(b) Social Networking

सोशल नेटवर्किंग

(c) Challenges of E-commerce

ई-कॉमर्स की चुनौतियाँ

5. (a) Explain the different challenges in Digital Marketing. 3

डिजिटल मार्केटिंग में विभिन्न चुनौतियों की व्याख्या कीजिए।

(b) Describe the Shielded and Unshielded Twisted Pair cable with its advantages. 4

शील्डेड और अनशील्डेड ट्विस्टेड पेयर केबल का इसके फायदों के साथ वर्णन करें।

SECTION – C

खण्ड – स

6. (a) What are IaaS, PaaS and SaaS in Cloud Computing ? 3

क्लाउड कंप्यूटिंग में IaaS, PaaS और SaaS क्या हैं ?

(b) What is Machine Learning ? Explain the three examples where we find Machine Learning in our day to day life. 4

मशीन लर्निंग क्या है ? तीन उदाहरण बताइए जहाँ हम अपने दैनिक जीवन में मशीन लर्निंग पाते हैं।

7. (a) What is Big Data ? What are the different applications of Big Data ? 3

बिग डेटा क्या है ? बिग डेटा के विभिन्न अनुप्रयोग क्या हैं ?

(b) Describe Blockchain. Write different applications of Blockchain. 4

ब्लॉकचेन का वर्णन करें। ब्लॉकचेन के विभिन्न अनुप्रयोग लिखें।

SECTION – D

खण्ड – द

8. (a) Write the four differences between NEFT and RTGS in tabular form. 3

NEFT और RTGS के बीच चार अंतर सारणीबद्ध रूप में लिखें।

(b) What are the major challenges in cyber security ? 4

साइबर सुरक्षा में प्रमुख चुनौतियाँ क्या हैं ?

9. (a) Explain the different Pillars of Digital India Initiative. 3

डिजिटल इंडिया पहल के विभिन्न स्तंभों की व्याख्या करें।

(b) Explain the various types of Cyber threats. 4

साइबर खतरों के विभिन्न प्रकारों की व्याख्या करें।

Roll No. .....

27553

Ability Enhancement Courses
1st Semester (w. e. f. Dec. - 2023)
(as per NEP-2020)
Examination – December, 2024

ENGLISH - I

Paper : 23ENGX01AE01

Time : Three Hours] *[Maximum Marks : 35*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***all*** the questions. All questions carry equal marks.

1. Attempt ***four*** items in all, selecting ***one*** from each unit in about **100-150** words : 7

(a) Semivowels and Diphthongs.

(b) Conjunction and Interjection

(c) Subject-verb Agreement. Give suitable examples.

(d) Skimming and its importance in Reading.

(e) What is noun ? Discuss its types.

(f) Define consonants sounds in English language.

UNIT – I

2. (i) Classify and describe the following speech sounds : 7

|ə|, |dz|, |ʃ|, |ŋ|, |æ|, |ʊ|, |ə|

(ii) Transcribe the following words (any *seven*) : Smile, fly, boy, few, bird, roses, loud, pool, mad, fan, seat, pin, say, rain.

UNIT – II

3. Spot the errors and rewrite the sentences correctly (any *seven*) : 7

(i) She married with a doctor.

(ii) I have visited Paris last weekend.

(iii) You cannot set a foot in this house.

(iv) I have read the Shakespeare's 'King Lear'.

(v) He neither has talent nor the desire to learn.

(vi) I don't have enough money to buy new car.

(vii) You can sit my next seat.

(viii) Thanks for giving me useful advices.

(ix) She is more taller than me.

UNIT – III

4. Attempt any *seven* of the following : 7

(a) Spot the errors :

(i) I have been to Delhi last summer.

(ii) She lives in United States.

(iii) He made very wise decision.

(iv) Reena has an important informations.

(b) Change the voice :

(i) She knows him.

(ii) Who wrote it.

(iii) Clean the room.

(c) Change the narration :

(i) He said, "I am going out".

(ii) She said, "I have been studying a lot".

(iii) They said, "They have built a house".

UNIT – IV

5. Write short notes on any *two* of the following : 7

(i) Scanning

(ii) Reading strategies

(iii) Barriers to Effective Reading

(iv) Reading as a basic skill

B.Tech. (ECE) 1st Semester (G-Scheme)

Examination, December-2024

INTRODUCTION TO ELECTROMAGNETIC THEORY

Paper -BSC-PHY-101-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in total, selecting one question from each section. **Question No. 1 is compulsory.** All questions carry equal marks.*

1. (a) Evaluate $\nabla\left(\frac{1}{r}\right)$ where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ is a position vector.

(b) Define dielectrics. Discuss their behaviour in external applied to electric fields.

(c) Define pointing vector. Discuss its significance.

(d) What are surface and volume bound currents?

(e) Check whether given field is electrostatic or magnetostatic field.

$$\vec{P} = 6x^2z^2\hat{i} - 3xz^2\hat{j}$$

(f) What will happen if a dipole is placed in an electric field? 6×2.5=15

Section-I

2. (a) What are bound charges? Derive an expression for field of polarized object. 10

   (b) Derive an expression for Gauss law in the presence of dielectrics. 5

3. Prove that 7, 8

   (a) $\nabla \times E = 0$

   (b) $\nabla . E = \frac{\rho}{\epsilon_0}$

Section-II

4. (a) Differentiate between scalar and magnetic vector potential. Derive an expression for equation of magnetic vector potential and its solution for volume current density. 12

   (b) Define magnetic permeability and susceptibility and derive relation between them. 3

5. (a) Discuss boundary conditions of B. 10

   (b) Define Auxiliary field. Derive an expression for it. 5

Section-III

6. (a) Deduce an expression for equation of continuity. Discuss its significance. 7

   (b) Define displacement current. Discuss the need of modification in Ampere's Law. 8

7. (a) Derive Maxwell's equation for matter. Discuss characteristics of each Maxwell's equation. 10

   (b) Obtain expression for energy stored in electromagnetic waves. 5

Section-IV

8. (a) Write characteristics of electromagnetic waves. Prove that electromagnetic waves are transverse in nature. 10

   (b) Derive an expression for pressure exerted by electromagnetic wave. 5

9. Use Maxwell's equations, to obtain wave equations for electromagnetic fields in homogeneous isotropic dielectric medium. Show that speed of electromagnetic waves in free space is more than in isotropic dielectric. 15

B.Tech. (Common for all Branches except CSE, ECE, IT, CS&IT and EEE) 1st Semester G-Scheme

Examination, December–2024

PROGRAMMING FOR PROBLEM SOLVING

Paper-ESC-CSE-102-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all. **Question No.1 is compulsory.** Attempt **four** more questions selecting exactly **one** question from each unit. All questions carry equal marks.*

1. (a) Discuss header files used in C-language.

(b) What do you understand by Pseudocode? Give examples.

(c) Define RAM.

(d) Define flowchart and the symbols used in flowchart.

(e) Find 2's complement of 1010010110100

(f) Define Data Types. 2.5×6=15

Unit-I

2. (a) Convert $(869)_{10}$ into $(\ )_2$, $(\ )_8$, $(\ )_{16}$ 5

(b) Convert $(10101101)_2$ into $(\ )_{16}$ 5

(c) Convert $(BC5)_{16}$ into $(\ )_2$ 5

3. Explain the components of computer system with its block diagram in detail. 15

Unit-II

4. (a) What is Algorithm? Write an algorithm to check the number is prime or not. 7.5

   (b) Draw a flowchart to find the roots of a quadratic equation. 7.5

5. (a) Write short note on : 8

   (i) Input and output functions

   (ii) Syntax and logical errors

   (b) Write an algorithm to calculate the simple interest. 7

Unit-III

6. What are Loops? Describe the loops available in C Programming language using suitable examples. 15

7. Explain various Conditional and Branching statements used in C programming. 15

Unit-IV

8. What are Arrays? Explain parameters passing in functions with an example. 15

9. Write short note on : 15

   (a) String Manipulation functions

   (b) Ackerman function

Roll No. .....

34713

Skill Enhancement Courses 1st Semester (For Four Year UG/Five Year Integrated Programs) w.e.f. 2024-25 as Per (NEP-2020) Examination – December, 2024

WEB DEVELOPMENT – I

Paper : 24CSC401SE01

Time : Three Hours] *[Maximum Marks : 20*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

प्रश्नों के उत्तर देने से पहले परीक्षार्थी यह सुनिश्चित कर लें कि उनको पूर्ण एवं सही प्रश्न-पत्र मिला है। परीक्षा के उपरान्त इस संबंध में कोई भी शिकायत नहीं सुनी जायेगी।

Note : Attempt ***five*** questions in all. Question No. 1 is ***compulsory***. In addition to ***compulsory*** question, attempt ***four*** more questions selecting ***one*** question from each Unit.

कुल ***पाँच*** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 ***अनिवार्य*** है। ***अनिवार्य*** प्रश्न के अतिरिक्त, प्रत्येक इकाई से ***एक*** प्रश्न चुनते हुए ***चार*** और प्रश्नों के उत्तर दीजिए।

1. Compulsory Question :

अनिवार्य प्रश्न :

(i) What is the primary purpose of the Internet ? 1

इंटरनेट का प्राथमिक उद्देश्य क्या है ?

(ii) What are the main components of a website ? 1

वेबसाइट के मुख्य घटक क्या हैं ?

(iii) What is the function of event listeners in web development ? 1

वेब विकास में इवेंट श्रोताओं का क्या कार्य है ?

(iv) What does CSS stand for, and what is its purpose ? 1

CSS का क्या अर्थ है, और इसका उद्देश्य क्या है ?

UNIT – I

इकाई – I

2. (a) Discuss the history of WWW. 2

WWW के इतिहास पर चर्चा करें।

(b) What is a domain name, and why is it essential for websites ? 2

डोमेन नाम क्या है, और यह वेबसाइटों के लिए क्यों आवश्यक है ?

3. Discuss how browser performance impacts your daily internet usage. What factors do you consider when determining if a browser is performing well ? 4

चर्चा करें कि ब्राउजर का प्रदर्शन आपके दैनिक इंटरनेट उपयोग को कैसे प्रभावित करता है। यह निर्धारित करते समय आप किन कारकों पर विचार करते हैं कि कोई ब्राउजर अच्छा प्रदर्शन कर रहा है या नहीं ?

UNIT – II

इकाई – II

4. (a) What are the steps required for web publishing ? 2

वेब प्रकाशन के लिए आवश्यक कदम क्या हैं ?

(b) What is the function of the <a> tag in HTML ? 2

HTML में <a> टैग का क्या कार्य है ?

5. What is the difference between front-end and back-end development ? 4

फ्रंट-एंड और बैक-एंड डेवलपमेंट में क्या अंतर है ?

UNIT – III

इकाई – III

6. (a) How does a polling feature enhance interactivity during presentations ? 2

प्रेजेंटेशन के दौरान पोलिंग फीचर इंटरएक्टिविटी को कैसे बढ़ाता है ?

(b) What is the role of screen-sharing in interactivity tools ? 2

इंटरएक्टिविटी टूल्स में स्क्रीन-शेयरिंग की क्या भूमिका है ?

7. What is the difference between var, let, and const in the context of javascript ? 4

जावास्क्रिप्ट के संदर्भ में var, let और const में क्या अंतर है ?

UNIT – IV

इकाई – IV

8. What are media queries in CSS3, and why are they important ? 4

CSS3 में मीडिया क्वेरी क्या हैं और वे क्यों महत्वपूर्ण हैं ?

9. What is the difference between relative, absolute, fixed and sticky positioning in CSS ? 4

CSS में रिलेटिव, एब्सोल्यूट, फिक्स्ड और स्टिकी पोजिशनिंग में क्या अंतर है ?

B. Tech. (CSE) 1st Semester G-Scheme

Examination, December–2024

PROGRAMMING FOR PROBLEM SOLVING

Paper-ESC-CSE-101- G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory.*** *Attempt* ***four*** *more questions selecting* ***one*** *question from each unit. All questions carry equal marks.*

1. Compulsory question :

(a) What is type conversion in C and what are the two types of conversions?

(b) Explain the difference between syntax errors and logical errors in C programming.

(c) What is the purpose of the *#include* directive in C?

(d) What is the difference between *if else* and switch statements in C?

(e) How are 2D arrays represented in memory and how are elements accessed?

(f) What is the difference between call by value and call by reference in C?

(g) What is dynamic memory allocation and why is it needed in C?

(h) How can a file be opened in read and write modes in C?

Unit-I

2. Explain the concept of an algorithm. Compare and contrast it by Pseudocode and Flowchart. How is it used to solve logical and numerical problems? Provide an example.

3. Explain the significance of storage classes in C and describe the differences between *static, extern, auto and register classes.*

Unit-II

4. What are preprocessors in C programming? Discuss the role of directives like *#include* and *#define* with suitable example.

5. Explain conditional statements in C, such as *if, else if,* and *switch,* and provide examples of their usage.

Unit-III

6. Explain the concept of one-dimenstional and two-dimensional arrays. How are they declared and used in C?

7. Describe how pointers are used with arrays in C. Provide an example of accessing array elements using pointers.

Unit-IV

8. What are pointers in C, and how are they declared and used? Explain the advantages of using pointers with an example.

9. Discuss dynamic memory allocation in C. Explain functions like *malloc, calloc, realloc* and *free.*

B.Tech. (CSE) 1st Semester (G-Scheme) Examination,

December–2024

MATH–I

Paper–BSC-MATH-103-G

Calculus and Linear Algebra

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all by selecting **one** question from each unit. **Question No. 1 is compulsory**. All questions carry equal marks.*

1. (a) Prove that $\beta(m, n) = \beta(n, m)$

(b) Compute that

$$\left(\begin{bmatrix} 1 & -2 & 3 \end{bmatrix} \begin{bmatrix} 7 & -1 & 5 \\ 0 & 2 & 4 \\ -7 & 5 & 0 \end{bmatrix} \right) - \begin{bmatrix} 2 & -5 & 7 \end{bmatrix}$$

(c) If $A = \begin{bmatrix} 1 & 2 & 5 \\ 2 & 3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$ find $|A|$.

(d) If $T : U \to V$ be a linear transformation, then prove $T(a_1u_1 + au_2 + \ldots\ldots + a_nu_n) = a_1T(u_1) + a_2T(u_2) + \ldots\ldots + a_nT(u_n)$

(e) Define Rank and Nullity of a Linear Transformation.

(f) If x, y are vectros in an inner product space V (F) then prove $x = y$ if $\langle x, z\rangle = \langle y, z\rangle$ for all $z \in V$.

Unit–I

2. (a) Examine the function

$$f(x, y) = x^3 + y^3 - 63(x + y) + 12xy$$

for maxima and minima.

(b) Show that for every value of x

$$\sin x = x - \frac{x^3}{\lfloor 3} + \frac{x^5}{\lfloor 5} + \ldots\ldots + (-1)^{n-1}\frac{x^{2n-1}}{\lfloor 2n-1} + (-1)^n\frac{x^{2n}}{\lfloor 2n}\sin\theta x$$

where $0 < \theta < 1$.

3. (a) Find the surface area of the solid generated by the revolution of the asteroid $x^{2/3} + y^{2/3} = a^{2/3}$ or $x = a\cos^3 t, y = a\sin^3 t$.

(b) Show that $\beta(p, q) = \int_0^\infty \frac{x^{q-1}}{(1+x)^{p+q}}dx$

Unit–II

4. (a) Solve the following equations by matrix method $x + 2y + 3z = 1$, $2x + 3y \quad 2z = 2$ and $3x + 3y + 4z = 1$.

(b) Are the following vectors linearly dependent ? If so find relation between them

$x_1 = (2, -1, 3, 2)$, $x_2 = (1, 3, 4, 2)$ and $x_3 = (3, -5, 2, 2)$.

5. (a) Use Gauss-Jordan method to find inverse of

$$\begin{bmatrix} 2 & 1 & -1 \\ 0 & 2 & 1 \\ 5 & 2 & -3 \end{bmatrix}.$$

(b) By determinants evaluate x, y, z, from the equations $x + 2z = 7$, $x + y + z = 6$ and $3x + y + z = 12$.

Unit–III

6. (a) Show that $Q(\sqrt{2}) = \{a + b\sqrt{2} : a, b \in Q\}$ is a vector space over Q, where

$$(a + b\sqrt{2}) + (c + d\sqrt{2}) = \{(a + c) + (b + d)\sqrt{2}\}$$

and $m(a + b\sqrt{2}) = ma + mb\sqrt{2}$.

(b) Determine whether the following set of vectors in R^3 (R) are Linearly dependent or Linearly dependent $\{(2, 3, 1), (-1, 4, 2), (1, 18, -4)\}$.

7. (a) Find the linear transformation $T : R^2 \to R$, for which $T(1, 1) = 3$ and $T(0, 1) = -2$.

(b) Show that composition of two invertible Linear transforms say $T_1 : U \to V$ and $T_2 : V \to W$ is also invertible, find $(T_2 T_1)^{-1} = ?$.

Unit–IV

8. For the liner operator $T : R^3 \to R^3$, find the eigenvalues and the basis for eigen space, when

$$T(x, y, z) = (x + y + z, 2y + z, 2y + 3z).$$

9. Prove that every finite dimensional inner product space has an orthonormal basis.

B.Tech. (Common for all Branches) 1st Semester (G-Scheme)
Examination, December-2024
BASIC ELECTRICAL ENGINEERING
Paper -ESC-EE-101G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all. **Question number 1 is compulsory.** Attempt **four** more questions from the **Section A, B, C** and **D** by selecting at least **one** question from each section.*

1. (a) State and explain KCL.

(b) Define Linear Networks.

(c) What is the need of Power factor improvement?

(d) Draw the phasor diagram of Ideal Transformer.

(e) Define Voltage regulation of transformer.

(f) Define slip in an Induction motor.

(g) What is the function of armature winding in DC machines?

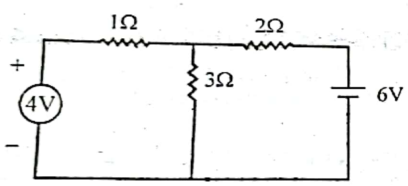
(h) What is deflecting torque in measuring instruments?

(i) State and explain Faradays law of electromagnetic induction.

(j) Discuss the Eddy current losses in Electrical Machines in brief. 10×2.5=25

Section-A

2. State and Explain Thevenin's theorem. Solve the given circuit to find the value of current flowing through 2 ohm resistor by using Nortons theorem. 12.5



3. Outline the step-by-step procedure for applying the Mesh analysis to find the voltage across a specific resistor in any given Electrical network. 12.5

Section-B

4. Discuss the B.H. Characteristics curve in detail. 12.5

5. Draw and explain the phasor diagram of single phase transformer on capacitive load. 12.5

Section-C

6. Explain how the revolving field is produced in stator of 3 phase induction motor? 12.5

7. Explain the construction and working principle of Synchronous motor. 12.5

Section-D

8. Explain the construction and working principle of watt meter in detail. 12.5

9. What do you mean by earthing? Discuss the working of ELCB in detail. 12.5

B.Tech. (Common for all Branches) 1st Semester (G-Scheme)
Examination, December-2024
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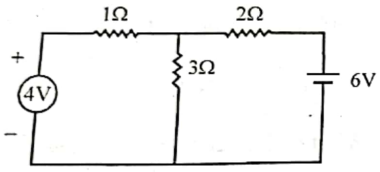

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B.Tech. (CSE) 1st Semester (G-Scheme) Examination,

December–2024

MATH–I

Paper–BSC-MATH-103-G

Calculus and Linear Algebra

Time allowed : 3 hours] *[Maximum marks : 75*

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[P.T.O.

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Unit–IV

8. For the liner operator $T : R^3 \to R^3$, find the eigenvalues and the basis for eigen space, when

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B. Tech. (CSE) 1st Semester G-Scheme

Examination, December–2024

PROGRAMMING FOR PROBLEM SOLVING

Paper-ESC-CSE-101- G

Time allowed : 3 hours] *[Maximum marks : 75*

*Note : **Question No. 1 is compulsory.** Attempt **four** more questions selecting **one** question from each unit. All questions carry equal marks.*

1. Compulsory question :

(a) What is type conversion in C and what are the two types of conversions?

(b) Explain the difference between syntax errors and logical errors in C programming.

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Unit-I

2. Explain the concept of an algorithm. Compare and contrast it by Pseudocode and Flowchart. How is it used to solve logical and numerical problems? Provide an example.

3. Explain the significance of storage classes in C and describe the differences between *static, extern, auto and register classes.*

Unit-II

4. What are preprocessors in C programming? Discuss the role of directives like *#include* and *#define* with suitable example.

5. Explain conditional statements in C, such as *if, else if,* and *switch,* and provide examples of their usage.

Unit-III

6. Explain the concept of one-dimenstional and two-dimensional arrays. How are they declared and used in C?

7. Describe how pointers are used with arrays in C. Provide an example of accessing array elements using pointers.

Unit-IV

8. What are pointers in C, and how are they declared and used? Explain the advantages of using pointers with an example.

9. Discuss dynamic memory allocation in C. Explain functions like *malloc, calloc, realloc* and *free.*

B.Tech. (Common for all Branches) 1st Semester

G-Scheme Examination, December–2024

CHEMISTRY-I

Paper-BSC-CH-101-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question No. 1 is compulsory.*** *Attempt* ***one*** *question from each unit. All questions carry equal marks.*

1. (a) Write mathematical representation of Schrodinger Wave Equation and physical significance of Ψ^2.

   (b) What are various units to measure hardness? Also mention the relationship between them.

   (c) Why IR spectroscopy is called vibrational spectroscopy?

   (d) Define chirality and chiral carbon with the help of a suitable example.

   (e) Define Ligand on the basis of Crystal Field Theory. Give example of two ligands.

   (f) Convert Acetyl chloride and Acetic anhydride into Aspirin.

15

Unit-I

2. (a) Discuss important points of Molecular Orbital Theory. 5

(b) Explain crystal field splitting in Octahedral complexes. 5

(c) On the basis of impurities added, explain the types of Intrinsic semiconductors. 5

3. Explain the following terms: 15

(i) Screening effect

(ii) Electronegativity

(iii) Polarising power and polarisability

Unit-II

4. (a) Differentiate the following : 10

(i) SN1 and SN2 reactions

(ii) Enantiomers and Diastereomers

(b) Write the oxidation and reduction reactions of carbonyl compounds. 5

5. Write short note on the following : 15

(a) Cyclisation reactions

(b) Structural isomerism in organic compounds

(c) Conformations of cyclohexane

Unit-III

6. (a) Suggest a suitable way to determine hardness of given water sample. Explain its principle and procedure. 7

(b) Discuss the terms "Exhaustion & Regeneration" with respect to Zeolite and Demineralisation process. 8

7. (a) Explain various types of Intermolecular forces present in molecules with at least one example of each. 8

(b) Define Corrosion. Discuss various environmental factors affecting the process of corrosion. 7

Unit-IV

8. Write a short note on the following: 15

(a) Magnetic Resonance Imaging

(b) Types of Vibrations in IR spectroscopy

(c) Upfield and Downfield of NMR signal

9. (a) Explain the principle and applications of UV spectroscopy. 7

(b) Give reason for the following: 8

(i) Splitting of NMR signal

(ii) TMS taken as standard in NMR spectroscopy