BSC

Roll No. .....

Total Pages : 3

1473

GSE/M-24

MATHEMATICS
(Ordinary Differential Equations)
Paper–BM-122

Time : Three Hours]

[Maximum Marks : B.Sc. : 40, B.A. : 26

Note : Attempt *five* questions in all, selecting atleast *one* question from each section. Question No. 9 is compulsory. Each question carries equal marks.

SECTION–I

1. (a) Solve $(x^3 + 3xy^2)dx + (3x^2y + y^3)dy = 0$.

(b) Solve $(1 + xy + x^2y^2)ydx + (x^2y^2 - xy + 1)xdy = 0$.

2. (a) Solve $y = 2px + yp^2$.

(b) Find the singular solution of $yp^2 - 2px + y = 0$.

SECTION–II

3. (a) Find the orthogonal trajectory of the family of curves $ax^2 + y^2 = 1$.

(b) Solve $\frac{d^2y}{dx^2} + y = \sec x$.

4. (a) Solve $\frac{d^2y}{dx^2}+4y=e^x+\sin 3x+x^2$.

(b) Solve $x^2\frac{d^2y}{dx^2}+4y\frac{dy}{dx}+2y=x+\sin x$.

SECTION–III

5. (a) Solve $\frac{d^2y}{dx^2}-2\tan x\frac{dy}{dx}+5y=\sin 2x\sec x$ by removing the first derivative.

(b) Solve $\frac{d^2y}{dx^2}+\tan x\frac{dy}{dx}+y\cos^2 x=0$ by changing the independent variable.

6. Solve $x^2\frac{d^2y}{dx^2}-2x\frac{dy}{dx}+2y=x\log x$ by the method of variation of parameters.

SECTION–IV

7. (a) Solve the simultaneous equations

$$\frac{dx}{y+z}=\frac{dy}{x+z}=\frac{dz}{x+y}.$$

(b) Solve the simultaneous equations $\frac{dx}{dt}+2x-3y=t$;

$\frac{dx}{dt}-3x+2y=e^{2t}$.

8. (a) Solve the simultaneous equations

$$\frac{dx}{1}=\frac{dy}{3}=\frac{dz}{5z+\tan(y-3x)}.$$

(b) Solve the total differential equations

$(y+z)dx+dy+dz=0$.

SECTION–V

9. (a) Define exact differential equation.

(b) Solve $p=\tan(px-y)$.

(c) Write the condition for x to be a particular solution of

$$\frac{d^2y}{dx^2}-P\frac{dy}{dx}+Qy=R.$$

(d) Write the necessary condition for the integrability of the total differential equation $Pdx+Qdy+Rdz=0$.

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9. Verify Gauss's divergence theorem for the function $\vec{f} = 4xz\hat{i} - y^2\hat{j} + yz\hat{k}$ over the surface S of the cube bounded by $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$.

8×1=8, 5

Roll No. ..... Total Pages : 4

GSE/M-24 **1474**

MATHEMATICS

(Vector Calculus)

Paper–BM-123

Time : Three Hours] [Maximum Marks : B.Sc. : 40, B.A. : 27

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

Compulsory Question

1. (a) For the value of λ so that the following vectors are coplanar

$\vec{a} = 2\hat{i} - 7\hat{j} + \lambda\hat{k}, \vec{b} = \hat{i} + 2\hat{j} - \hat{k}, \vec{c} = 3\hat{i} - 5\hat{j} + 2\hat{k}$.

2, 2

(b) Show that curl $\vec{f} = \vec{0}$; $\vec{f} = z\hat{i} + x\hat{j} + y\hat{k}$. 2, 2

(c) Prove that $\frac{d}{dt}\hat{e}_\rho = \dot{\phi}\hat{e}_\phi$ and $\frac{d}{dt}\hat{e}_\phi = -\dot{\phi}\hat{e}_\rho$

where dots denotes the differentiation w.r.t. t. 2, 2

(d) Show that $\oint_C \varphi \nabla\varphi . d\vec{r} = 0$, C being a closed curve.

2, 1

SECTION–I

2. (a) Show that volume of a tetrahedron is $\frac{1}{6}$th of volume of a parallelopiped. 4, 2½

(b) Show that $\vec{a}\times(\vec{b}\times\vec{c}), \vec{b}\times(\vec{c}\times\vec{a}), \vec{c}\times(\vec{a}\times\vec{b})$ are coplanar. 4, 2½

3. (a) The necessary and sufficient condition for the vector function $\vec{f}$ of a scalar variable t to have a constant magnitude is $\vec{f}\cdot\frac{d\vec{f}}{dt}=0$. 4, 2½

(b) A particle moves along the curves $x = 3t^2$, $y = t^2 - 2t$, $z = t^3$. Find its velocity and acceleration at $t = 1$ in the direction of vector $\vec{a}=\hat{i}+\hat{j}-\hat{k}$. 4, 2½

SECTION–II

4. (a) Find the directional derivative of $\phi = 3y^2 + yz^3$ at the point (2, –1, 1) in the direction of normal to the surface $x \log z - y^2 + 4 = 0$ at point (–1, 2, 1). 4, 2½

(b) Prove that

$$\text{div}(\varphi\vec{f}) = (\text{grad}\ \varphi)\cdot\vec{f} + \varphi(\text{div}\ \vec{f}).$$ 4, 2½

5. (a) Show that $r^n\vec{r}$ is irrotational where $\vec{r}=x\hat{i}+y\hat{j}+z\hat{k}$ and $r=|\vec{r}|$. 4, 2½

(b) Show that $\nabla\times\nabla\phi=\vec{0}$. 4, 2½

SECTION–III

6. (a) If $\psi = xyz$, evaluate $\nabla\psi$ in spherical co-ordinates. 4, 2½

(b) Let $x = uv\cos w$, $y = uv\sin w$, $z=\frac{1}{2}(u^2-v^2)$. Obtain h_1, h_2, h_3 and the unit vectors $\hat{e}_1, \hat{e}_2, \hat{e}_3$.. 4, 2½

7. (a) Show that $\frac{d\hat{e}_r}{dt}=\frac{d\theta}{dt}\hat{e}_\theta+\sin\theta\frac{d\varphi}{dt}\hat{e}\varphi$ where (r, θ, φ) denotes the spherical polar co-ordinates of a point. 4, 2½

(b) If ρ, φ, z are cyclindrical co-ordinates, show that $\nabla\varphi$ and $\nabla\log\rho$ are solenoidal. 4, 2½

SECTION–IV

8. (a) If $\vec{f}=(2x+y)\hat{i}+(3y-x)\hat{j}$; evaluate $\int_C \hat{f}\cdot d\vec{r}$ where C is the curve in xy plane consisting of the straight lines from (0, 0) to (2, 0) and then to (3, 2). 4, 2½

(b) If $\vec{f}=(2x^2-3z)\hat{i}-2xy\hat{j}-4x\hat{k}$, evaluate $\iiint_V \nabla\times\vec{f}\,dv$, where v is the region bounded by the co-ordinate planes and the plane $2x + 2y + z = 4$. 4, 2½

Roll No. ..... Total Pages : 2

1477

GSE/M-24

PHYSICS

(Properties of Matter and Kinetic Theory of Gas)

Paper–I (PH-201)

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions at all. Question No. 1 is compulsory. Attempt *one* question from each unit.

Compulsory Question

1. (a) What is the role of moment of inertia for designing flywheel? (2)

(b) Prove that the torque required to twist a hollow cylinder greater than the solid cylinder. (2)

(c) Explain law of Equipartition of energy. (2)

(d) What is effect of temperature on the Maxwell-Boltzman distribution of speed? (2)

UNIT–I

2. What is torsional pendulum? How the moment of inertia of an irregular body can be determine with it. (8)

3. Derive an expression for moment of inertia of hollow cylinder about principal axis by application of theorem of parallel axis. (8)

UNIT–II

4. What is bending moment of beam? Derive an expression for the depression due to a centrally loaded metallic beam by neglecting the weight of beam. (8)

5. What is Maxwell Needle? Discuss the necessary theory and measurement method for determination of modulus of rigidity of a cylindrical wire using it. (8)

UNIT–III

6. Discuss the postulates of kinetic theory of gas. Using these derive kinetic gas equation. Give the kinetic interpretation of temperature. (8)

7. Discuss Andrew's experiment for liquification of a gas. Derive the various relations between critical constant and Vander-waal constant. (8)

UNIT–IV

8. Derive an expression for Maxwell Boltzman distribution of velocity of gas molecules. Discuss the effect of temperature and velocity on distribution. (8)

9. What do you mean by Transport phenomenon? Derive an expression thermal conductivity of a gas at temperature (T). (8)

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Total Pages : 3

1478

GSE/M-24

PHYSICS

(Semiconductor Devices)

Paper–II (PH-202)

Time : Three Hours]

[Maximum Marks : 40

Note : Question No. 1 is compulsory. Attempt *four* more questions, selecting *one* question from each unit. Use of Scientific (non-programmable) calculator is allowed.

Compulsory Question

1. (i) What are charge carriers in case of metals and semiconductors? (2)

(ii) Common emitter (CE) configuration of a transistor is generally preferred over other configurations. (2)

(iii) Why do gain falls in low and high frequency ranges in an amplifier? (2)

(iv) What are resonant oscillators? Name the different types of resonant oscillators. (2)

UNIT–I

2. (a) What is a P-N junction diode? Explain its working in forward and reverse biasing. (6)

(b) For a circuit of Zener diode, input voltage $V_i = 100$ V, Series resistance $R_s = 5$ kilo-ohms, Zener voltage = 50 V and load resistance = 10 kilo ohms, find the current through the Zener diode. (2)

3. (a) What is a rectifier? Derive an expression of ripple factor and efficiency of a half wave rectifier. (5)

(b) What do you mean by a filter? Discuss working of a π filter. (3)

UNIT–II

4. (a) Discuss the advantages and disadvantages of using common emitter configuration of a transistor. (5)

(b) A transistor is connected in common emitter configuration. The collector supply is 8 V and voltage drop across a resistor of 800 ohms in collector circuit is 0.4 V. If $\alpha = 0.96$, find the base current. (3)

5. (a) What is a load line? How is it obtained and discuss its importance? (4)

(b) Draw voltage divider biasing circuit and explain its working. (4)

UNIT–III

6. (a) Describe the working of a common base PNP transistor as an amplifier. (6)

(b) An amplifier has a voltage gain of 1000. If a negative feedback is applied to input circuit, the voltage gain reduces to 1/10 of its value without feedback. Calculate the feedback fraction factor. (2)

7. (a) Draw the circuit diagram of an emitter-follower. Mention its important characteristics and uses. Why it is named so. (4)

(b) Show that negative feedback increases stability and reduces distortions in an amplifier. (4)

UNIT–IV

8. (a) Discuss the basic principle of an oscillator. Draw the circuit diagram and explain working of a common emitter-collector tuned oscillator. (6)

(b) The tuned oscillator circuit used in the local oscillator of a radio receiver make use of an LC tuned circuit with L = 0.3 mH and C = 300 pF. Calculate the frequency of oscillations. (2)

9. What is a cathode ray tube? Discuss the block diagram and working of a cathode ray oscilloscope. (8)

Roll No. ..... Total Pages : 3

1479

GSE/M-24

CHEMISTRY

[Inorganic Chemistry (Theory)]

Paper : IV (CH-104)

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *five* questions in all, selecting at least *two* questions from each Section. Question number 1 is compulsory.

Compulsory Question

1. (a) Name the colours shown by Na and Ca in flame colouration test.

(b) Write electronic configurations of K and Ra atoms.

(c) Can Sodide ion (Na^- ion) exist?

(d) Write the formula of Pyrosulphuric acid.

(e) Write formula of Borazole.

(f) Give an example of amphoteric oxide.

(g) Name the alkali metal used in photoelectric cell.

(h) Draw the structure of P_4O_{10}. (1×8=8)

SECTION-A

2. (a) Discuss essential conditions of Hydrogen Bonding?

(b) Why H_2O is liquid but H_2S is a gas at room temperature? (2)

(c) Discuss n-type and p-type semiconductors with example. (2)

3. (a) Discuss various types of Vander Waals forces. (2)

(b) Describe briefly induced dipole-induced dipole forces. (2)

(c) What is the behaviour of sodium metal in liquid Ammonia? (2)

4. (a) Discuss biological importance of Mg and Ca ions. (2)

(b) Which alkali metal acts as strongest reducing agent and why? (2)

(c) Discuss the structures of XeF_2 and $XeOF_4$ molecules. (2)

5. (a) Why does acetic acid exist in dimeric form? (2)

(b) Discuss important uses of semiconductors. (2)

(c) Discuss complexation tendencies of Alkali Metals. (2)

SECTION-B

6. (a) Write a short note on Ortho and Pyrosilicates. (2)

(b) What happens when diborane is burnt in oxygen? (2)

(c) Discuss properties and uses of Carbides. (2)

7. (a) Discuss structure and bonding in Inorganic Benzene. (2)

(b) Explain the concept of back bonding in boron halides. (2)

(c) Discuss important uses of Silicone Polymers. (2)

8. (a) Write Name and structures of any *four* oxy acids of Phosphorus. (2)

(b) What do you mean by Interhalogen Compounds? (2)

(c) Write about important uses of hydrogen peroxide (H_2O_2). (2)

9. (a) Arrange the following acids in decreasing order of their acidic strength : BF_3, BCl_3, BBr_3. (2)

(b) Discuss the structure of IF_7? (2)

(c) Why does CCl_4 resist hydrolysis but $SiCl_4$ gets hydrolysed? (2)

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GSE/M-24

CHEMISTRY

[Physical Chemistry (Theory)]

Paper : V (CH-105)

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *five* questions in all, selecting *two* questions from each Section. Question No. 1 is compulsory.

Compulsory Question

1. (a) Who gave the effect of temperature on the rate of reaction? Write that equation.

(b) What is the rate expression for zero order kinetics?

(c) Define temperature coefficient.

(d) Why reactions of higher order are rare?

(e) What is main limitation of Ostwald dilution law?

(f) Define time of relaxation.

(g) Write *two* applications of Kohlrausch's Law.

(h) Define ionic product of water. (8×1=8)

SECTION-A

2. (a) What is rate law? How does it differ from law of mass of action. 3

(b) Show that the time required for 99% completion is twice the time required for the completion of 90% reaction. 3

3. (a) Derive an integrate rate expression for first order kinetics. Also discuss the relation between k and t½. 4

(b) The rate of reaction becomes double when the temperature changes from 293 K to 303 K. Calculate the energy of activation (E_a) of reaction assuming that it does not change with temperature. 2

4. (a) What do you mean by pseudomolecular reaction? Give *two* examples. 3

(b) List the factors affecting the rate of a reaction. 3

5. (a) Give the rate equation as obtained from collision theory between similar molecules. 3

(b) Briefly describe the Transition state theory. 3

SECTION-B

6. (a) Define the following terms :

(i) End point.

(ii) Cell constant.

(iii) Inter-ionic effects. 3

(b) Discuss the effect of dilution of molar conductance and specific conductance of electrolytic solutions. 3

7. (a) Write the significance of Debye-Huckle-Onsagar theory. 2

(b) The equivalent conductance at infinite dilution for NaI, CH_3COONa and $(CH_3COO)_2Mg$ are 12.69, 9.10 and 18.78 $S\ cm^2\ eq^{-1}$ respectively. Calculate the equivalent conductance at infinite dilution of MgI_2? 4

8. (a) Discuss the principle of conductometric titration. Discuss the titration curve obtained in the titration of (i) HCl *versus* NaOH (ii) AgCl *versus* $NaNO_3$ (precipitation reactions). 4

(b) Write short note on Buffer solution. Discuss their types in detail. 2

9. (a) How can you determine transport number from Hittorf's method? Discuss three factors which affect the transport number. 3

(b) Calculate the pH of a sample of soft drink whose hydronium ion concentration is 3.8×10^{-3} M. 3

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1481

GSE/M-24

CHEMISTRY

(Organic Chemistry)

(Theory)

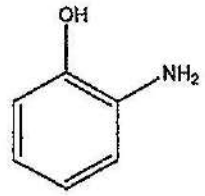
Paper : VI (CH-106)

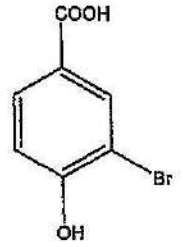
Time : Three Hours] [Maximum Marks : 32

Note : Attempt *five* questions in all, selecting at least *two* questions from each Section. Question No. 1 is compulsory.

Compulsory Question

1. (a) Write IUPAC names of following compounds





(b) Name the 3 types of dienes. Write them in increasing order of stability.

(c) What type of reaction intermediate is formed during the addition of HBr to alkenes in the presence of peroxide?

(d) Write one example each of secondary and tertiary alkyl halides along with name and structure.

(2×4=8)

SECTION–A

2. (a) Explain 1,2-hydride shift during the dehydration of alcohols to form alkenes with suitable example.

   (b) Discuss the synthesis of alkenes by dehydrohalogenation of alkyl halides. (3,3)

3. (a) Explain the ring opening of epoxides in basic medium with mechanism.

   (b) Discuss the mechanism of Ozonolysis of alkenes. (3,3)

4. (a) What are Annulenes? Give one example each of an aromatic, antiaromatic and nonaromatic annulene.

   (b) Give the reaction and mechanism of Friedel-Craft Alkylation of benzene. (3,3)

5. (a) Define Aromaticity. State Huckel Rule and explain with suitable examples.

   (b) Explain m-directing and deactivating nature of $-NO_2$ group. (3,3)

SECTION–B

6. (a) What is Diel's Alder reaction? Explain with mechanism.

   (b) Terminal alkynes are acidic in nature. Explain. (3,3)

7. (a) Write the products formed during the addition of Br_2 to 1,3-Butadiene. Explain with mechanism.

   (b) Make the following conversions :

   (i) $HC\equiv CH \rightarrow CH_3CHO$

   (ii) $HC\equiv CH \rightarrow NC–CH=CH_2$. (3,3)

8. (a) S_N1 reactions of alkyl halides are accompanied by partial racemization. Explain.

   (b) Discuss the factors affecting S_N2 reactions. (3,3)

9. (a) Give Benzyne mechanism of Nucleophilic Aromatic Substitution in Aryl halides.

   (b) Write Balz-Schiemann reaction for the synthesis of fluorobenzene. (3,3)

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Total Pages : 5

1482

GSE/M-24

ENGLISH

Paper–110

(Course-117)

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt all questions.

1. Read the passage given below and answer the questions that follow :

So far as putting a lid on a child's curiosity, Indian schools have been no different. Children are encouraged to memorise the text as well as the answers to the questions raised therein, regardless of whether they understood the subject matter or not. Their schools hardly provide suitable outlets to their spontaneous questions in case they didn't.

Questions :

(a) For what are children encouraged to ?

(b) What is the general attitude of teachers in India?

(c) What concern is the author talking about?

(d) Find words from the passage which mean :

(i) Cram.

(ii) Produced naturally.

(e) Make sentences of : memorise, regardless.

OR

War seems now a video game, where 'victory' produces a good feeling as computer-generated destruction is revealed on a video screen. The heroism, the bravery, the risk of combat : all the things which have for so long been a part of military endeavours seem no longer a part of warfare. More ominously, war seems to have become an activity without consequences.

Questions :

(a) According to the author, what does war seem now?

(b) How can the war now be fought?

(c) What used to be a part and parcel of old time wars?

(d) What does the author want to convey through this passage?

(e) Make sentences of : endeavour, consequence. 5

2. Explain with reference to the context :

Yet, another defect of our civilization is that it does not know what to do with its knowledge. Science, as we have seen, has given us powers fit for gods, yet we use them like small children. For example, we do not know how to manage our machines. Machines, as I have already explained, were made to be man's servants, yet he has grown so dependent on them that they are in a fair way to become his masters.

OR

What I would like to be remembered for is not doing the first heart transplant in the world. I would like to be remembered for the children I have treated for a variety of abnormal heart disease. That gives me the greatest satisfaction. Reconstruction of a congenitally abnormal heart, building that into a normal one through surgery, that's real cardiac surgery for me. 3

3. Answer any *three* of the following questions in about 30 words each :

(a) What are the League of Nations and the U.N.?

(b) How is inequality different from graded inequality?

(c) How are women discriminated against in the case of basic facilities?

(d) What is role learning? What, according to the writer, is wrong with it? 6

4. Answer the following :

Summarise the main arguments of the essay 'Inhumanisation of War'.

OR

What are the major defects of our civilization, according to C.E.M. Joad? 6

5. Translate the following passage into Hindi :

The change from the school to the university is the greatest event which happens in our lives. We are making a new start. We are full of hope and ambition. The world that is opening before us has a great charm and awakens a feeling of romance. We are independent as we have never been before. We sit down in our own masters and can do as we please.

OR

(For Non-Hindi speaking/Foreign Candidates Only)

Read the given passage and answer the questions that follow :

The best part of every man's education is that which he gives to himself. The education received at school or college is a beginning, and is valuable chiefly because it trains the mind and makes it accustomed to continuous application and study. Knowledge conquered by labour becomes a prossession, a property entirely our own. Our own effort is an essential thing, and no facilities, no teachers, no amount of lesson learnt by rote will enable us to do without it.

Questions :

(a) Why is education valuable?

(b) When does the knowledge become our property?

(c) Explain : 'Continuous application'.

(d) Why our own effort is the most essential thing?

(e) Assign a suitable heading to the passage. 5

6. Make a precis of the following passage and give it a suitable title :

We sometimes think that it would be very nice to have no work to do. How we envy rich people who have not to work for their living, but can do just what they please all the year round. Yet when we feel like this, we make a mistake. Sometimes rich people are not so happy because they are tired of having nothing to do. The first thing the work does for us is to give us happiness. The work gives us self-respect. The idler, however, rich he is, lives on the work of others. He is like a beggar in the streets who takes the money of others, who have had to toil for it. Such people do not live independently and ought to feel ashamed of themselves. But the honest worker who earns his living by useful toil, can hold up his head and respect himself. Lastly, regular work helps to build up character. It teaches us good habits as punctuality, carefulness, throughness and faithfulness in work. 7

7. Write a letter to the Deputy Commissioner requesting him to open a dispensary in your village.

OR

Write an application to the Librarian of your college for the remission of library fine. 8

Roll No. .....

Total Pages : 3

GSE/M-24

1485

BOTANY

(Diversity of Archegoniates)

Paper–I

Time : Three Hours]

[Maximum Marks : 40

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

नोट : प्रत्येक इकाई से **दो** प्रश्न चुनते हुए कुल **पाँच** प्रश्न कीजिए। प्रश्न सं. 1 अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question (अनिवार्य प्रश्न)

1. Comment on the followings :

(i) Sorus.

(ii) Megasporophyll.

(iii) Prothallus.

(iv) Perigonial leaves. (4×2=8)

निम्नलिखित पर टिप्पणी कीजिए :

(i) सोरस।

(ii) मेगास्पोरोफिल।

(iii) प्रोथेलस।

(iv) पेरिगोनियल पत्तियां।

UNIT–I (इकाई–I)

2. Describe the antheridiophore and archegoniophore of *Marchantia* by giving suitable diagrams. 8

मार्केंसिया के एंथेरिडियोफोर और आर्कगोनिओफोर का वर्णन उपयुक्त चित्र के साथ कीजिए।

3. Describe the morphology and anatomy of sporophyte of Funaria. 8

फूनेरिया के स्पोरोफाइट की आकृति विज्ञान और शरीर रचना का वर्णन करें।

4. Describe the morphology and anatomy of thallus of *Anthoceros* and its reproduction. 8

एंथोसेरोस के थैलस की आकृति विज्ञान और शरीर रचना और इसके प्रजनन का वर्णन करें।

5. Draw labelled diagrams of the followings :
   (i) V. S. of sporophyte of *Anthoceros*. 4
   (ii) V. S. of mature capsule of *Funaria*. 4

निम्नलिखित का नामांकित चित्र बनाइए :

(i) एन्थोसेरोस के स्पोरोफाइट के वी.एस. का।

(ii) फूनेरिया के परिपक्व कैप्सूल के वी.एस. का।

UNIT–II (इकाई–II)

6. Describe the morphology and anatomy of reproductive structures of *Rhynia* with the help of suitable diagrams. 8

राइनिया की प्रजनन संरचनाओं की आकृति विज्ञान और शरीर रचना का उपयुक्त चित्रों की सहायता के साथ वर्णन कीजिए।

7. Describe the reproductive structures of *Selaginella* by giving suitable diagrams. 8

सेलाजिनेला की प्रजनन संरचनाओं का उपयुक्त चित्र देकर वर्णन कीजिए।

8. Describe the structure of strobili, sporangiophores and sporangia of *Equisetum*. 8

इक्विसेटम को स्ट्रोबिली, स्पोरैंगियोफोर्स और स्पोरैंगिया की संरचना का वर्णन करें।

9. Explain the morphology and anatomy of plant body of *Pteris* by giving suitable labelled diagrams. 8

टैरिस के पौधे के शरीर की आकृति विज्ञान और शरीर रचना का नामांकित चित्र के साथ वर्णन करें।

Roll No. ..... Total Pages : 2

1486

GSE/M-24

BOTANY

(Genetics)

Paper–II

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) What is the origin recognition complex (ORC)?

(b) How does hydroxylamine cause mutations?

(c) What is the importance of plasmids to bacteria?

(d) Name the techniques used for the determination of 3-D protein structures. (4×2=8)

UNIT–I

2. (a) Give an account of the properties of genetic code.

(b) How does DNA polymerase I differ from DNA polymerase III? (2×4=8)

3. (a) How do nucleic acid-protein interactions make biological processes possible?

(b) Give an account of satellite DNA. (2×4=8)

4. (a) Describe the initiation and termination of DNA replication in prokaryotes.
   (b) How does allelic gene interaction differ from non-allelic one? (2×4=8)

5. (a) What is linkage? How is it related to independent assortment and crossing over?
   (b) Discuss the packaging of DNA into chromatin. (2×4=8)

UNIT–II

6. (a) Briefly explain the organization of the mitochondrial genome.
   (b) What is an operon? Describe the regulation of lac operon. (2×4=8)

7. (a) How does the initiation of protein translation differ in prokaryotes and eukaryotes? (5)
   (b) Discuss the factors affecting the occurrence of spontaneous mutations. (3)

8. Write on the following :
   (a) Initiation of transcription in prokaryotes.
   (b) Mechanisms of DNA repair. (2×4=8)

9. Explain the regulation of gene expression in eukaryotes. (8)

Roll No. .....

Total Pages : 2

1487

GSE/M-24

ZOOLOGY

(Life and Diversity of Annelida to Arthropoda & Genetics-I)

Paper–I

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *two* questions each from Section-A and Section-B. Question No. 1 is compulsory. Illustrate your answer with suitable diagram(s) wherever necessary.

Compulsory Question

1. Give brief account of the following in about 20 words each :

(a) Clitellum.

(b) Nephridia.

(c) Haemolymph.

(d) Malpighian tubule.

(e) Metamerism.

(f) Sex linkage.

(g) Crossing over.

(h) Phenotype.

(i) Allele.

(j) Incomplete dominance. (10×1=10)

SECTION–A

2. Describe the digestive system of earthworm. (7.5)

3. Give a brief note on the following :
   (a) General characteristics of Phylum Annelida. (4)
   (b) Trochophore larva. (3.5)

4. Write short notes on the following :
   (a) Moth parts of grasshopper. (4)
   (b) Economic importance of insects. (3.5)

5. Describe the structure and working of compound eye of grasshopper. (7.5)

SECTION–B

6. What is heredity? Explain Mendel's law of segregation with a suitable example. (7.5)

7. Discuss the cytoplasmic inheritance by taking the example of killer traits in *Paramecium*. (7.5)

8. Describe the various mechanisms of sex determination in animals. (7.5)

9. (a) Coupling and repulsion hypothesis. (4)
   (b) Chromosomal theory of linkage. (3.5)

Roll No. .....

Total Pages : 3

1488

GSE/M-24

ZOOLOGY

(Life and Diversity of Mollusca to Hemichordata and Genetics–II)

Paper–II

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *five* questions in all. Question. No. 1 is compulsory and answer to each part should not exceed 20 words. Attempt *two* questions from Section A and two questions from Section B. Draw well labelled diagrams wherever they are required.

Compulsory Question

1. (a) What is torsion and detorsion?

(b) What is Osphradium?

(c) What is Pluteus larva?

(d) Name *two* types of pedicellariae.

(e) Name the larva found in Hemichordates.

(f) What is ABO compatibility?

(g) What are the causes of Down's syndrome?

(h) What is the cause of sickle cell anemia?

(i) What is hnDNA?

(j) What are Okazaki fragments? (1×10=10)

SECTION–A

2. Draw a neat and well labelled diagram of :
   (a) Nervous system of *Pila.*
   (b) Haemal and perihaemal system of *Asterias.*
   (4+3.5=7.5)

3. (a) What is pallial complex and its role in *Pila.*
   (b) Draw a well labelled diagram of nervous system of *Pila.* (4+3.5=7.5)

4. Describe the alimentary canal and feeding in Balanoglossus. (7.5)

5. Write notes on the following :
   (a) Madreporite.
   (b) Brachiolaria larva.
   (c) Tiedemann's Body. (2.5+2.5+2.5=7.5)

SECTION–B

6. Write notes on the following :
   (a) ABO blood groups.
   (b) Amniocentesis.
   (c) Phenylketonuria. (2.5+2.5+2.5=7.5)

7. Describe *three* types of RNA and give their role in protein synthesis. (7.5)

8. Write note on the following :
   (a) Turner's Syndrome.
   (b) Klinefelter's syndrome. (4+3.5=7.5)

9. Define :
   (a) Central Dogma.
   (b) tRNA.
   (c) RNA Polymerase. (2.5+2.5+2.5=7.5)

Roll No. .....

Total Pages : 3

1491

GSE/M-24

ELECTRONIC SCIENCE

(Electronic Devices and Circuits–II)

Paper–I (Theory)

Time : Three Hours]

[Maximum Marks : 40

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

Compulsory Question

1. (a) State the factors to be considered while designing a biasing circuit for a good transistor voltage amplifier. 2

(b) Explain why the input resistance of MOSFET is high. 2

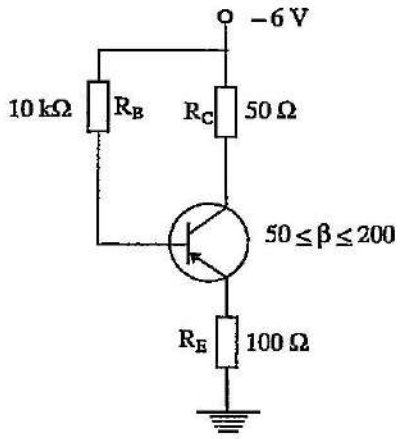
(c) Explain the Band-width of an amplifier. 2

(d) What are the requirements of a biasing circuit? 2

UNIT–I

2. (a) Explain fixed bias circuits in details. What are its disadvantages? 5

(b) Find the value of RB for germanium transistor with beta = 20 and I_{CBO} = 20 micro Amperes. Also find I_C if beta changed to 25 and I_{CBO} = 10 micro Amperes due to rise in temperature. 3



3. (a) What do you understand by transistor biasing? Why it is needed? 2.5

(b) Why collector to base biasing circuit is not used? 2.5

(c) Is the operating point of a transistor amplifier is fixed? If not, what are the factors responsible for its shift? 3

UNIT–II

4. (a) Explain the biasing circuit with emitter resistor. Why it is not preferred? 5

(b) Explain gain of a multi stage amplifier in detail. 3

5. (a) Explain voltage divider biasing circuit. What it is widely used? 6

(b) What are the drawbacks of bias circuit emitter feedback? 2

UNIT–III

6. (a) Explain frequency response curve of an RC coupled amplifier and explain the reasons for fall of gain at high frequency range. 6

(b) For an RC-coupled amplifier a voltage gain of 1000 in the frequency range of 400 Hz to 20 kHz. Gain falls on either side of frequencies by 3 dB at 100 Hz and 40 kHz. Find gain in dB at cut-off frequencies and draw its frequency response curve. 2

7. (a) Explain the frequency response curve of R-C coupled amplifier. Why gain remain constant at mid frequency region. 6

(b) Explain Bandwidth of an amplifier. 2

UNIT–IV

8. (a) Draw and explain the drain characteristics of N-channel JFET. Also explain I_{DSS} and V_P. 4

(b) Explain Small Signal low frequency Model of FET. 4

9. (a) Define and drive the relation between Trans-conductance (G_m), Drain Resistance (R_D) and Amplification factor of FET. 4

(b) Why the input resistance of FET is high? 2

(c) Draw and explain drain and transfer characteristics of an N-channel depletion MOSFET. 2

9. (a) What is a BCD adder? Discuss the working of a 4-bit BCD adder using with the help of its circuit diagram. (6)

(b) What is a parity generator? Where is it used? (2)

Roll No. ..... Total Pages : 4

1492

GSE/M-24

DIGITAL ELECTRONICS–I

(Theory)

Paper–II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt five questions in all, selecting one question from each unit. Question No. 1 is compulsory. All questions carry equal 8 marks.

Compulsory Question

1. (a) What is Y in the given expression : $(245)_{16} = (Y)_{10}$

(b) Implement AND gate using NOR gates.

(c) What do you understand by propagation delay in a logic family? How is it related with power dissipation?

(d) What is a combinational circuit? Give three examples. (2×4=8)

UNIT–I

2. (a) Determine the values of P, Q, R and S :

(i) $(1010101)_2 = (P)_{10}$

(ii) $(10010.011)_2 = (Q)_{10}$

(iii) $(523)_{10} = (R)_2$

(iv) $(36.45)_{10} = (S)_2$ (4)

(b) Convert the following decimal numbers into Hexadecimal system numbers and then from Hexadecimal system number into binary system numbers :

(i) 575

(ii) 773 (4)

3. (a) Convert the following binary numbers into Octal system numbers and then from Octal system number into decimal system numbers :

(i) 11000110

(ii) 11011011.100110 (4)

(b) Convert the following decimal numbers into Excess-3 codes :

(i) 48

(ii) 345.76 (2)

(c) Implement using 2's complement

67 – 45 (2)

UNIT–II

4. (a) Design a 2-input OR gate using PN- Diodes. Make its equivalent symbol and explain its working with the help of its truth table. (4)

(b) Convert the following Boolean expressions into their Canonical forms :

(i) F1 (A, B, C) = AB + A'C + BC

(ii) F2 (A, B, C, D) = (A+B+D) (A'+C'+D') (A+C+D') (4)

Note : A' represents complement of A and similarly other variables.

5. (a) What is a K-Map? Minimize the given Boolean expression using K-Map and implement the minimized function using NOR gates only.

F (A, B, C, D) = Π (1, 4, 5, 8, 10, 13) + Φ (2, 7, 11) (6)

(b) NOR gate is known as universal gate. Why? (2)

UNIT–III

6. (a) What is a DTL logic? Explain the working of DTL logic with the help of circuit diagram. What are its merits and de-merits? (4)

(b) Define V_{IL} , V_{IH} , I_{OL} and I_{OH} with the help of voltage level diagram (V_{IL}, V_{IH}) for a logic family. (4)

7. (a) What are unipolar and bipolar logic families? Explain in brief detail with their respective advantage and disadvantages. (4)

(b) What do you understand by noise margins and why are they necessary? Explain with the help of voltage level diagram. (4)

UNIT–IV

8. (a) What is a parallel binary adder? Make the block diagram of a 4-bit parallel binary adder using full adders. (4)

(b) What is a half subtractor? Explain it with the help of its truth table and implement its circuit. (4)

Roll No. ..... Total Pages : 2

1494

GSE/M-24

COMPUTER SCIENCE

(Logical Organization of Computers)

Paper–II

Time : Three Hours] [Max. Marks : B.Sc. : 40, B.A. : 25

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

Compulsory Question

1. (a) Define Duality Principle.

(b) What is an XOR gate?

(c) Describe Shift Register.

(d) Describe self complimenting code using example.

UNIT–I

2. Convert the following :

$(7.3)_{10} = (?)_2$ $(1234)_{10} = (?)_5$

$(AF3C)_{16} = (?)_8$ $(125)_8 = (?)_{10}$.

3. What is Error Detecting and Correcting Codes? Explain with example.

UNIT–II

4. (a) Define Boolean Algebra and write its postulates.
   (b) Solve using Boolean Algebra
   $XY + \overline{X}Z + YZ = XY + \overline{X}Z$.

5. (a) Prove that NAND is a Universal Gate.
   (b) What is Truth Table? Explain with suitable examples.

UNIT–III

6. What is Combinational Circuit? Describe the design procedure of Combinational Circuit by giving example.

7. (a) Make circuit for
   $X = (AB + AB)\ (CD + CD)\ (XY + XY)$
   (b) What is Decoder? Explain by using example.

UNIT–IV

8. What is Flip-Flop? Explain the working of JK Flip-Flop.

9. What do you mean by Counter? Differentiate between Synchronous and Asynchronous counters.

Roll No. ..... Total Pages : 03

NBST/M-24 **26150**

DIGITAL ELECTRONICS-II

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

1. (a) A 4 bit Mod-16 counter uses JK flip-flop. If Propagation delay of each flip-flop is 50 ms, what will be the maximum clock frequency ?

(b) Enlist the steps to design a sequence generator.

(c) Compare PLAs and PALs.

(d) Compare static and dynamic RAM cells.

(e) What is a sample and hold circuit ? Where is it used ? **5×2=10**

Unit I

2. (a) Design a 3 bit UP/Down synchronous counter using JK flip-flop. 8

(b) Enlist the applications of counters. 2

3. (a) Differentiate between Synchronous and Asynchronous counter. 3

(b) Design a Modulus 8 Asynchronous counter using JK flip-flop. Also draw its timing diagram. 7

Unit II

4. (a) Draw the logic diagram of 4-bit SISO shift register using D flip-flops. The Data give in 1011. 3

   (b) Explain the working of Universal shift Register in detail. 7

5. (a) Explain the operation of 4-bit Twisted Ring counter taking suitable example. 5

   (b) Describe the working of 4-bit Parallel in Parallel out shift register. Explain, how data can be shifted in and out from such register. 5

Unit III

6. (a) Draw the basic structure of RAM cell. Also explain the read and write operations of Dynamic RAM Cell . 7

   (b) Differentiate between PAL and PLA. 3

7. (a) Implement a Full Adder Circuit using Programmable Logic Array having three inputs, eight product terms and two outputs. 6

   (b) Design a 4 K × 8 memory chip using 2K × 8 chips. 4

Unit IV

8. Explain the operation of R-2R ladder type DAC and the weighted resistor type DAC. 10

9. Explain the principle of operations of the following : 10
   (i) Single Slope ADC
   (ii) Successive Approximation ADC.

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NBST/M-24 **26151**

OFFICE AUTOMATION TOOLS

B23-HIT-202

Time : Three Hours] [Maximum Marks : 50

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

1. Write short notes on the following :
   (a) User Interface
   (b) Spreadsheet functions
   (c) Computer Network architecture
   (d) Sharing folders in google drive.

Unit I

2. What do you mean by Operating System ? Explain the features and architecture of the OS in detail.
3. What is a Word processor ? Explain the formatting options available in it with suitable examples.

Unit II

4. Explain the following excel functions with suitable examples :

   (a) sum (b) count

   (c) avg (d) max

   (e) min.

5. What do you mean by Slides ? Explain the process of presentation creation with suitable examples.

Unit III

6. (a) What are the objectives of a computer network ?

   (b) Explain the World Wide Web.

7. What do you mean by web browsing ? Explain the concept of search engines w.r.t. world wide web.

Unit IV

8. What do you mean by Google Office ? Explain.

9. (a) What do you mean by google docs ? How are they different from standalone word processors ?

   (b) Explain the google slides with suitable examples.

Roll No. ..... Total Pages : 02

NBST/M-24 **26152**

BASICS OF WEB DEVELOPMENT

B23-HIT-203

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

1. (i) What is WWW and URL ?

(ii) What are empty elements in XML ?

(iii) What is difference between HTML elements and Tags ?

(v) What is concept of Cookies and how are they used ?

Unit-I

2. Explain Web browsers. Discuss working of any *one* browser with search shortcuts.

3. (a) Explain structure of HTML document with example.

(b) How many types of Heading tags and Line Tags HTML contain ?

Unit II

4. What is CSS, write basic structure and syntax using CSS ?

5. In context of CSS explain with example :
   (a) Style sheet properties
   (b) Box display properties
   (c) Background color.

Unit III

6. What is XML ? Write Features of XML.

7. (a) Discuss XML namespace, Document Type Definitions and Schemas.
   (b) Discuss XSL and SOAP.

Unit IV

8. What is DOM ? Discuss Array declaration and allocation in Java Script.

9. (a) Explain Looping structures in Javascript.
   (b) What is difference between function declaration and function expression ?

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Total Pages : 03

GSE/M-24

1819

INTRODUCTORY HOME MANAGEMENT

Course 114

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

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

Compulsory Question (अनिवार्य प्रश्न)

1. Write short notes on the following : **2×4=8**

(a) Objectives of Management

(b) Abilities

(c) Controlling

(d) Values.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) प्रबंधन के उद्देश्य

(ब) क्षमताएँ

(स) नियंत्रित करना

(द) मूल्य ।

Unit I (इकाई I)

2. Which type of managerial skills are required for managing the home well ? 8

घर को अच्छी तरह से प्रबंधित करने के लिए किस प्रकार के प्रबंधकीय कौशल की आवश्यकता होती है ?

3. How stages of family life-cycle affect the process of home management ? 8

पारिवारिक जीवन-चक्र की अवस्थाएँ गृह प्रबंधन की प्रक्रिया को कैसे प्रभावित करती हैं ?

4. Discuss in detail the entire process of management giving suitable examples. 8

उपयुक्त उदाहरण देते हुए प्रबंधन की संपूर्ण प्रक्रिया की विस्तार से चर्चा कीजिए ।

5. Highlight the qualities of a good home-maker. 8

एक अच्छी गृहिणी के गुणों पर प्रकाश डालिए ।

Unit II (इकाई II)

6. Define Standards. Discuss their classification and importance in our life. 8

मानकों को परिभाषित कीजिए । उनके वर्गीकरण और हमारे जीवन में महत्व की चर्चा कीजिए ।

7. Discuss in detail the decision-making process. 8

निर्णय लेने की प्रक्रिया पर विस्तार से चर्चा कीजिए ।

8. Classify the goals. Write a detailed account of the factors affecting goal setting. 8

लक्ष्यों को वर्गीकृत कीजिए । लक्ष्य निर्धारण को प्रभावित करने वाले कारकों का विस्तृत विवरण लिखिए ।

9. What are resources ? Explain the significance of human and non-human resources. 8

संसाधन क्या हैं ? मानव और गैर-मानव संसाधनों के महत्व की व्याख्या कीजिए ।

7. Explain the role of Vitamin C and Niacin in human nutrition and their significance in metabolic processes. 8
मानव पोषण में विटामिन सी और नियासिन की भूमिका और चयापचय प्रक्रियाओं में उनके महत्त्व की व्याख्या कीजिए ।

8. Discuss the biological roles of minerals calcium and zinc and their importance in human nutrition. 8
खनिज कैल्शियम और जिंक की जैविक भूमिका और मानव पोषण में उनके महत्व पर चर्चा कीजिए ।

9. (a) Give a brief account of characteristics and significance of enzymes and coenzymes. 4
एंजाइमों और सहएंजाइमों की विशेषताओं और महत्त्व का संक्षिप्त विवरण दीजिए ।

(b) Describe the effect of change in pH and temperature on enzyme activity. Explain the mechanism. 4
एंजाइम गतिविधि पर पी.एच. और तापमान में परिवर्तन के प्रभाव का वर्णन कीजिए । तंत्र को समझाइए ।

Roll No. ..... Total Pages : 04

GSE/M-24 1821

NUTRITIONAL BIOCHEMISTRY

Course-116

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.
प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

1. (a) Define macronutrients and give one examples.
मैक्रोन्यूट्रिएंट्स को परिभाषित कीजिए और एक उदाहरण दीजिए ।

(b) Name the enzymes involved in the digestion of proteins.
प्रोटीन के पाचन में शामिल एंजाइमों का नाम बताइए ।

(c) Name the vitamin deficiency of which is related to night blindness disorder.
उस विटामिन का नाम बताइए जिसकी कमी रतौंधी विकार से संबंधित है ।

(d) Explain the importance of sodium in human nutrition.
मानव पोषण में सोडियम के महत्त्व की व्याख्या कीजिए ।

(e) What is the role of coenzymes in enzyme activity ?
एंजाइम गतिविधि में कोएंजाइम की क्या भूमिका है ?

(f) Define saponification value.
साबुनीकरण मूल्य को परिभाषित कीजिए ।

(g) Name *one* water-soluble vitamin and its main function.
एक पानी में घुलनशील विटामिन और उसके मुख्य कार्य का नाम बताइए ।

(h) Explain the role of iron in human nutrition.
मानव पोषण में लौह की भूमिका स्पष्ट कीजिए । 8×1=8

Unit I (इकाई I)

2. Describe the general properties and functions of carbohydrates and proteins in human nutrition. 8
मानव पोषण में कार्बोहाइड्रेट और प्रोटीन के सामान्य गुणों और कार्यों का वर्णन कीजिए ।

3. (a) Discuss the digestion and metabolism of nucleic acids and their importance in human health. 4
न्यूक्लिक एसिड के पाचन और चयापचय और मानव स्वास्थ्य में उनके महत्त्व पर चर्चा कीजिए ।

(b) Explain the properties and significance of lipids in human diet. 4
मानव आहार में लिपिड के गुण और महत्व की व्याख्या कीजिए ।

4. (a) Define and explain the importance of acid value and saponification value of fats. 4
वसा के अम्ल मान और साबुनीकरण मान के महत्त्व को परिभाषित कीजिए तथा समझाइए ।

(b) Define standard amino acids. Classify these amino acids based on the structure of their R-chains. 4
मानक अमीनो एसिड को परिभाषित कीजिए । इन अमीनो एसिड को उनकी आर-शृंखला की संरचना के आधार पर वर्गीकृत कीजिए ।

5. Draw the structure and importance of the following : 8
(a) Sucrose
(b) Lactose
(c) Palmitic acid
(d) Sulphur containing amino acids.
निम्नलिखित की संरचना और महत्त्व बताइए :
(अ) सुक्रोज
(ब) लैक्टोज
(स) पामिटिक एसिड
(द) सल्फर युक्त अमीनो एसिड ।

Unit II (इकाई II)

6. Describe the chemistry and biological functions of Vitamins D & E and their importance in human health. 8
विटामिन डी और ई के रसायन और जैविक कार्यों और मानव स्वास्थ्य में उनके महत्त्व का वर्णन कीजिए ।

Roll No. ..... Total Pages : 3

NBAE/M-24 **3954**

HOME SCIENCE
(Nutrition Science)
Paper – B23-HSC-201
(CC-A2)

Time : Three Hours] [Maximum Marks : 35

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

नोट : प्रत्येक इकाई से **एक** प्रश्न चुनते हुए कुल **पाँच** प्रश्न कीजिए। प्रश्न सं. 1 अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question (अनिवार्य प्रश्न)

1. Write short notes on the following :

(i) Nutrition. 2
(ii) Balanced diet. 2
(iii) Sucrose. 1
(iv) Maltose. 1
(v) Fatty acids. 1

निम्नलिखित पर संक्षिप्त टिप्पणी लिखिए :

(i) पोषण।
(ii) संतुलित भोजन।
(iii) सूक्रोज।

(iv) माल्टोज।

(v) फैटी अम्ल।

UNIT–I (इकाई–I)

2. Write down the classification of Carbohydrates. 7
कार्बोहाइड्रेट का वर्गीकरण लिखिएं।

3. What are the functions of Carbohydrates? 7
कार्बोहाइड्रेट के कार्य क्या हैं?

UNIT–II (इकाई–II)

4. Explain the functions and sources of water for Human body. 7
मानव शरीर के लिए पानी के कार्यों और स्रोतों की व्याख्या कीजिए।

5. Write brief notes on the following :
(a) Fiber and it's types.
(b) Deficiency of Fiber. 7
निम्न पर संक्षिप्त टिप्पणी लिखिए :
(क) फाइबर और इसके प्रकार।
(ख) फाइबर की कमी।

UNIT–III (इकाई–III)

6. Explain various types of water soluble. 7
पानी में घुलनशील के विभिन्न प्रकारों की व्याख्या कीजिए।

7. Explain the functions of different Vitamins. 7
विभिन्न विटामिनों के कार्यों की व्याख्या कीजिए।

UNIT–IV (इकाई–IV)

8. Define Minerals and their classifications. 7
खनिजों और उनके वर्गीकरणों को परिभाषित कीजिए।

9. Differentiate between Macro minerals and Micro minerals. 7
मैक्रो खनिजों और माइक्रो खनिजों के बीच अंतर कीजिए।

Roll No. .....

Total Pages : 3

NGSE/M-24

3955

HOME SCIENCE

(Family Resource Management)

Paper – B23-HSC-202

(CC-B2)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each unit as well as compulsory question.

नोट : अनिवार्य प्रश्न के साथ प्रत्येक इकाई से **एक** प्रश्न चुनते हुए कुल **पाँच** प्रश्न कीजिए।

Compulsory Question (अनिवार्य प्रश्न)

1. Define the following in 3-4 lines :
   (i) Resources.
   (ii) Values.
   (iii) Goals.
   (iv) Energy Management.
   (v) Real Income. (5×2=10)

   निम्नलिखित को 3–4 पंक्तियों में परिभाषित कीजिए :
   (i) संसाधन।
   (ii) मूल्य।
   (iii) लक्ष्य।

(iv) ऊर्जा प्रबंधन।

(v) वास्तविक आय।

UNIT–I (इकाई–I)

2. Discuss concept of Home Management. 10
गृह प्रबंधन की अवधारणा की विवेचना कीजिए।

3. Write down classification of resources. 10
संसाधनों के वर्गीकरण लिखिए।

UNIT–II (इकाई–II)

4. Discuss classification and characteristics of values. 10
मूल्यों के वर्गीकरण और विशेषताओं की विवेचना कीजिए।

5. What is decision-making? Why there is need of decision making? 10
निर्णय लेना क्या है? निर्णय लेने की आवश्यकता क्यों है?

UNIT–III (इकाई–III)

6. Write down the tools in time management. 10
समय प्रबंधन में उपकरण लिखें।

7. Explain household methods of work simplification. 10
कार्य सरलीकरण के घरेलू तरीकों की व्याख्या करें।

UNIT–IV (इकाई–IV)

8. Discuss in detail money income. 10
धन आय की विस्तार से विवेचना कीजिए।

9. Explain difference between savings & investment. Discuss different types of investments. 10
बचत और निवेश के बीच अंतर की व्याख्या कीजिए। विभिन्न प्रकार के निवेशों की विवेचना कीजिए।

UNIT–IV (इकाई–IV)

8. Explain Communication. Explain the importance and barriers of communication process. 10

संचार की व्याख्या करें। संचार प्रक्रिया के महत्व और बाधाओं की व्याख्या कीजिए।

9. Discuss role of photography in communication. 10

संचार में फोटोग्राफी की भूमिका की विवेचना कीजिए।

Roll No. ..... Total Pages : 4

NBAE/M-24 **3956**

HOME SCIENCE

(Extension Education and Communication)

Paper – B23-HSC-203

(CC-C2)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each unit as well as compulsory question.

नोट : कुल **पाँच** प्रश्न कीजिए, अनिवार्य प्रश्न के साथ प्रत्येक इकाई से **एक** प्रश्न कीजिए।

Compulsory Question

(अनिवार्य प्रश्न)

1. Give full form of the following :
   (a) ICAR.
   (b) DWARCA.
   (c) NIN.
   (d) DRDA.
   (e) TRYSEM.
   (f) ICMR.
   (g) UNICEF.
   (h) NIPCID.
   (i) ICDS.
   (j) PMRY. (10×1=10)

निम्नलिखित का पूर्ण रूप दीजिए :

(क) आई.सी.ए.आर.।

(ख) डी.डब्ल्यू.ए.आर.सी.ए.।

(ग) एन.आई.एन.।

(घ) डी.आर.डी.ए.।

(ङ) टी.आर.वाई.एस.ई.एम.।

(च) आई.सी.एम.आर.।

(छ) यूनिसेफ।

(ज) एन.आई.पी.सी.आई.डी.।

(झ) आई.सी.डी.एस.।

(ञ) पी.एम.आर.वाई.।

UNIT–I (इकाई–I)

2. What do you understand by Extension Education? Discuss its scope and objectives. 10

विस्तार शिक्षा से आप क्या समझते हैं? इसके कार्यक्षेत्र और उद्देश्यों की विवेचना कीजिए।

3. Discuss the role and qualities of an extension education worker. 10

विस्तार शिक्षा कार्यकर्ता की भूमिका और गुणों की विवेचना कीजिए।

UNIT–II (इकाई–II)

4. Give a detailed note on group contact teaching methods. 10

समूह संपर्क शिक्षण विधियों पर विस्तृत टिप्पणी दीजिए।

5. Explain any *two* of the following : (2×5=10)

(a) Print Media.

(b) Seminar.

(c) Exhibition.

(d) Discussion.

निम्नलिखित में से **दो** की व्याख्या कीजिए :

(क) प्रिंट मीडिया।

(ख) सेमिनार।

(ग) प्रदर्शनी।

(घ) विचार-विमर्श।

UNIT–III (इकाई–III)

6. Write down the features of the following : (2×5=10)

(a) Beti Bachao Beti Padhao.

(b) ICDS.

निम्नलिखित की विशेषताएं लिखिए :

(क) बेटी बचाओ बेटी पढ़ाओ।

(ख) आई.सी.डी.एस.।

7. Discuss the role of the following organizations : (2×5=10)

(a) ICMR.

(b) UNESCO.

निम्नलिखित संगठनों की भूमिका की विवेचना कीजिए :

(क) आई.सी.एम.आर.

(ख) यूनेस्को।

Roll No. ..... Total Pages : 2

3891

NBAE/M-24

FORENSIC SCIENCE

(Animal Diversity of Chordates)

Paper : 23-ZOO-201

(CC-2/MCC-3)

(5-Year Integrated)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory. Support your answer with neat and labelled diagram(s) wherever necessary.

Compulsory Question

1. Answer the following in brief :

(a) Retrogressive metamorphosis.

(b) Neoteny.

(c) Missing link.

(d) Viviparous.

(e) Heterocercal fin. (5×2=10)

UNIT–I

2. Describe salient features of chordates. Give an outline classification of chordates upto classes with suitable examples. 10

3. Give an account of systematic position, habitat, habits and external morphology of *Herdmania*. 10

UNIT–II

4. Describe the digestive system of *Labeo*. 10

5. Write short notes on the following :
   (a) Fish scales. 5
   (b) Swim bladder. 5

UNIT–III

6. Describe structure and working of heart of frog. 10

7. Write short notes on the following :
   (a) Parental care in amphibians. 5
   (b) General characters of reptiles. 5

UNIT–IV

8. Describe the female reproductive system of rat. 10

9. Write short notes on the following :
   (a) Fight adaptations in birds. 5
   (b) Unique features of mammals. 5

Roll No. .....

Total Pages : 5.

3896

NBAE/M-24

CHEMISTRY

(Chemistry–II)

Paper–23-CHE-201

(CC-2/MCC-3)

Time : Three Hours]

[Maximum Marks : 50

Note : The candidate is required to attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory. Log table and non-programmable calculator is allowed.

Compulsory Question

1. (a) Briefly explain the concept of hybridization in covalent bonding.

(b) Discuss Fajan's rule.

(c) Explain the significance of half-life period in determining the rate of reaction.

(d) Discuss the limitations of Baeyer's strain theory in explaining the stability of cycloalkanes.

(e) Briefly explain the distinction between hydrogen bonding and Van der Waals forces. (5×2=10)

UNIT–I

2. (a) Explain the Valence Shell Electron Pair Repulsion (VSEPR) theory and how it is used to predict the shapes of molecules. Provide examples of

molecules with linear, trigonal planar, tetrahedral, and octahedral arrangements.

(b) Using the concept of hybridization, describe the formation and geometry of the following molecules :

(i) BF_3

(ii) SF_6

Explain the type of hybrid orbitals involved in each case.

(c) Calculate the bond order of the nitrogen molecule N_2 using Molecular Orbital Theory. Based on the bond order, predict whether the molecule is stable or not. 4, 4, 2

3. (a) Describe the structure and coordination number of NaCl. Explain how the radius ratio rule is applied to predict the coordination number in this ionic compound. Discuss one limitation of the radius ratio rule.

(b) Using the Born-Haber cycle, derive the lattice energy of sodium chloride (NaCl). Given the following data :

Ionization energy of Na : 496 kJ/mol

Electron affinity of Cl : –349 kJ/mol

Sublimation energy of Na : 108 kJ/mol

Dissociation energy of Cl_2 : 243 kJ/mol

Formation enthalpy of NaCl : –411 kJ/mol

(c) What is solvation energy? Discuss how solvation energy affects the solubility of ionic solids. (4,4,2)

UNIT–II

4. (a) Define the rate of a chemical reaction and write the general form of the rate equation. Discuss two factors that influence the rate of a chemical reaction.

(b) Derive the integrated rate expression for a first-order reaction. Using this expression, show how the half-life period of a first-order reaction is independent of the initial concentration of the reactant.

(c) The rate constant (k) of a reaction at 300 K is 2.5×10^{-3} sec^{-1}. When the temperature is increased to 350 K, the rate constant becomes 7.5×10^{-2} sec^{-1}. Calculate the activation energy (Ea) for the reaction using the Arrhenius equation. (4,4,2)

5. (a) Derive the Nernst distribution law thermodynamically for a solute distributing between two immiscible solvents. Explain the assumptions made in this derivation.

(b) Discuss the modifications in the Nernst distribution law when the solute undergoes association in one of the phases. Provide one example.

(c) The concentration of aniline hydrochloride in water and an organic solvent was found to be 0.02 M and 0.005 M respectively. If the hydrolysis constant K_h of aniline hydrochloride is 1.8×10^{-5}, calculate the degree of hydrolysis (h) of aniline hydrochloride. (4,4,2)

UNIT–III

6. (a) Explain the mechanism of free radical halogenation of alkanes. Discuss the factors affecting the reactivity and selectivity of the halogenation process.

   (b) Describe the Wurtz reaction and the Corey-House reaction. Provide one example for each reaction, including the chemical equations.

   (c) Calculate the number of structural isomers possible for the alkane with the molecular formula C_5H_{12}. Draw their structures. (4,4,2)

7. (a) Explain the mechanism of dehydration of alcohols to form alkenes. Use 2-butanol as an example and show the formation of the major product. Discuss the role of the Saytzeff rule in determining the major product.

   (b) Describe the hydroboration-oxidation reaction of alkenes. Using 1-hexene as an example, outline the mechanism and show the structure of the product formed. Explain why this reaction does not follow Markownikoff's rule.

   (c) Predict the major product of the following reaction and justify your answer using Markownikoff's rule :

   $CH_3–CH=CH_2 + HBr \longrightarrow ????$ (4,4,2)

UNIT–IV

8. (a) Define hydrogen bonding and distinguish between intermolecular and intramolecular hydrogen bonding.

   Provide one example for each type and explain how these bonds influence the physical properties of the substances involved.

   (b) Discuss the effects of hydrogen bonding on the boiling point and solubility of substances. Explain why water has a higher boiling point than methane and why alcohols are generally more soluble in water than ethers of comparable molecular weight.

   (c) Briefly describe the two main types of Van der Waals forces. (4,4,2)

9. (a) Explain the band theory of metallic bonding. How does this theory account for the electrical conductivity of conductors, semiconductors, and insulators?

   (b) Discuss the different types of semiconductors and how they are categorized. Explain their significance in electronic devices.

   (c) Silicon is a widely used semiconductor material. Describe one key application of silicon in modern technology. (4,4,2)

Roll No. ..... Total Pages : 2

3898

NBAE/M-24

CHEMISTRY

(Chemistry–II)

Paper–23-CHE-203

(CC-M2)

Time : Three Hours] [Maximum Marks : 20

Note : Attempt *four* questions in all, selecting *one* question from each section. Question No. 1 is compulsory.

Compulsory Question

1. (a) Name the highest electron gain enthalpy atom.

(b) State the conditions of Frenkel defect.

(c) Define (+) Electromeric effect.

(d) Discuss the effect of temperature on collision frequency. (1×4=4)

UNIT–I

2. (a) Define ionization energy. Explain the factors affecting the ionization energy. (1,2)

(b) Name a superhalogen atom. (1)

3. (a) Define atomic radius. Why the size of cation is always smaller than its parent atom? (2)

(b) Calculate the effective nuclear charge for the one of $3p$ electrons of chlorine atom which has electronic configuration $1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^5$. (2)

UNIT–II

4. (a) Explain Born-Haber cycle for the calculation of lattice energy of an ionic compound. (2.5)
   (b) Write the differences between Schottky and Frenkel defect. (1.5)

5. (a) Arrange the following in the decreasing order of Lattice energy, $BaSO_4$, $SrSO_4$, $CaSO_4$ and $MgSO_4$. (2)
   (b) Define polarization power. Explain Fajan's rules. (2)

UNIT–III

6. (a) Explain Localized and delocalized chemical bonds with example. (2)
   (b) Write short note on London forces? (2)

7. (a) Define inductive effect. Discuss their types. (3)
   (b) Why Chloroacetic acid is more acidic than acetic acid? (1)

UNIT–IV

8. (a) Write the postulates of 'Kinetic theory of gases'. (2)
   (b) Define the term 'Mean free path'. (2)

9. (a) At what temperature, the root mean square velocity of methane is same as that of sulfur dioxide (SO_2) at 27°C? (3)
   (b) Define Most probable velocity. (1)

Roll No. ..... Total Pages : 3

3899

NBAE/M-24

ELECTRONICS

(Electronic Devices and Basic Digital Electronics)

Paper : 23-ELE-201

(CC-2/MCC-3)

Time : Three Hours] [Maximum Marks : 50

Note : Question No. 1 is compulsory. Attempt *one* question selecting from each unit.

Compulsory Question

1. (a) Why BJT is called Bipolar and FET is a Unipolar device?

(b) Derive the relation between JFET parameters.

(c) Perform all basic gates with NAND gates.

(d) State the advantages of CMOS logic.

(e) What are Universal Gates? Why are they called so? (5×2=10)

UNIT-I

2. (a) Explain how the operating point is selected for amplification in CE mode using graphical method only. 4

(b) What is bias stabilization? What is the need of bias stabilization? 4

(c) Why is voltage divider biasing circuit preferred over other biasing circuits? 2

3. (a) Show that the operating point in voltage divider biasing circuit is independent of β. 8

(b) If β of a transistor is 95, $I_c = 4.5$ mA, then calculate base current. Neglect the reverse saturation current. 2

UNIT-II

4. (a) Explain Working Principle of N-channel JFET. Also draw the drain characteristics of N-Channel JFET. 5

(b) Write a short note on Complementary Metal Oxide Semiconductor (CMOS). 5

5. (a) Describe the construction and characteristics of N-channel Depletion MOSFET. 5

(b) Draw & explain small signal model of common source Amplifier. 5

UNIT-III

6. (a) Perform the following operations :

(i) Covert 111101100 into octal.

(ii) Convert Decimal 167 into Hexadecimal.

(iii) Write the 2's complement form of 11001100100.

(iv) Multiply 110011 by 11001.

(v) Simplify the expression : (AB+C)(AB+D). (5×1=5)

(b) (i) Add decimal 569 and 687 into BCD.

(ii) Perform the subtraction using 2's complement : $(1000100)_2 - (1010100)_2$. (2×2.5=5)

7. (a) State and prove De Morgan's Laws. 4

(b) Solve using K-map :

$Y = \sum m(0,2,4,6,8,10,12,13,15)$ & $d(1,5,7,9)$ and realize the circuit using NOR gates. 6

UNIT-IV

8. (a) Describe all basic logic gates with a truth table and circuit symbol. 5

(b) Briefly explain the operation of TTL NAND gate. 5

9. (a) Briefly explain the operation of CMOS NOR gate. 5

(b) Define noise margin. What is its importance? 2

(c) State the advantages of CMOS logic. 3

Roll No. .....

Total Pages : 3

3901

NBAE/M-24

ELECTRONICS

(Basic Electronic Components and Devices)

Paper : 23-ELE-203

(CC-M2)

Time : Three Hours]

[Maximum Marks : 20

Note : (i) There are nine questions in this paper. All questions carry equal marks.

(ii) Attempt *five* questions in all.

(iii) Question No. 1 is compulsory.

(iv) Attempt remaining *four* questions by selecting only *one* question from each unit.

Compulsory Question

1. (a) Find the value of a carbon resistor using colour code scheme if the different bands are Red, yellow, and gold. 1

(b) Write the use of clamping circuits. 1

(c) Why common emitter amplifier is preferred? 1

(d) What do you mean by parallel resonance frequency in RLC circuit? Find the impedance of the circuit at resonance. 1

UNIT–I

2. (a) Write short note on light emitting diode. 1

   (b) What are the different types of capacitors available in market? Also write their applications. 3

3. (a) With the help of circuit diagram, draw and explain the V-I characteristics of a PN Junction diode under forward and reverse biased condition. 3

   (b) Write the applications of fuse in daily life. 1

UNIT–II

4. (a) Draw the circuit diagram of a half-wave rectifier and explain its working. 3

   (b) Write the applications of Zener diode. 1

5. Draw the circuit diagram of a full-wave rectifier and explain its working. Also draw the input and output waveform in full wave rectifier. 4

UNIT–III

6. Draw the circuit diagram and discuss the working of a transistor as an amplifier. 4

7. With the help of circuit diagram, draw and explain the input and output characteristics of N-P-N transistor in Common Emitter configuration. 4

UNIT–IV

8. (a) A series RLC circuit has R = 20 Ω, L = 20 mH and C = 100 μF. Calculate the resonant frequency, Q factor and bandwidth of the circuit. 3

   (b) Why a RLC series resonance circuit is called an acceptor circuit? 1

9. (a) Derive the expression for current in series R-L-C circuit and also find the impedance of the circuit. 3

   (b) Define quality factor of a coil. 1

Roll No. ..... Total Pages : 3

3908

NBAE/M-24

BOTANY

(Plant Taxonomy and Ecology)

Paper–23-BOT-201

(CC–2/MCC–3)

Time : Three Hours] [Maximum Marks : 50

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

Compulsory Question

1. (a) ICBN stands for.
   (b) What are punched card keys?
   (c) Define Verticillaster Inflorescense.
   (d) Gynobasic Style.
   (e) Inflorescence of Wheat.
   (f) Define Relative Humidity (RH).
   (g) Define Ecads or Ecophenes.
   (h) Pyramid of Biomass.
   (i) Name Green House Gases.
   (j) Ex-Situ Conservation. (10)

UNIT–I

2. Discuss Botanical Nomenclature and rules of ICBN and ICN. (10)

3. Write notes on the following :
   (a) Importance of Botanical Gardens.
   (b) Monographs. (5+5=10)

UNIT–II

4. Discuss Benthom and Hooker's system of classification. (10)

5. Write notes on the following :
   (a) Androceum of Family Leguminoseae.
   (b) Floral Diagramme and floral formulae of Ocimum. (5+5=10)

UNIT–III

6. Discuss the role of temperature in distribution of plants along latitude and altitude. (10)

7. Write short notes on the following :
   (a) Ecotypes.
   (b) Parasitism.
   (c) Hydrosere. (3+2+5=10)

UNIT–IV

8. Write short notes on the following :
   (a) Effects of Industrial wastes in water on ecosystem.
   (b) Photochemical Smog.
   (c) Impact of Global warming. (3+3+4=10)

9. Define Biodiversity and its threat and discuss about the conservation methods adopted in India. (10)

UNIT–IV

8. (a) Define Linear congruence and its solution. Also solve the linear congruence $15x \equiv 12 (\text{mod } 36)$.

(b) Show that $n^7 - x$ is divisible by 42.

9. (a) If $(p-1)! + 1 \equiv 0 \pmod{p}$, then show that p is a prime number.

(b) Find all integers that give the remainder 1, 2, 3 when divided by 3, 4, 5 respectively.

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NBAE/M-24 **3911**

MATHEMATICS

(Algebra and Number Theory)

Paper–23-MAT-201

(CC-2/MCC-3)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each unit and compulsory question. All questions carry equal marks.

Compulsory Question

1. (a) Define Hermitian and Skew Hermitian matrix. Show that

$$\begin{bmatrix} 0 & 1+i & 2+3i \\ 1-i & 1 & -i \\ 2-3i & i & 0 \end{bmatrix}$$

is Hermitian matrix.

(b) Apply Descarte's rule of signs to prove that all the roots of $x^4 - 3x^3 - 5x^2 + 2x - 1 = 0$ are real.

(c) Find the quotient and the remainder when $x^5 - 2x^3 + x - 5$ is divided by $x + 5$.

(d) Define divisibility of two numbers. Show that $8^n - 3^n$ is divisible by 5.

(e) Find all the solutions of $12x + 20y = 129$ in positive integers.

UNIT–I

2. (a) Define normal form of a matrix and find ranks of

$$\begin{bmatrix} 1 & -1 & 2 & -1 \\ 4 & 2 & -1 & 2 \\ 2 & 2 & -2 & 0 \end{bmatrix}$$

after reducing in this form.

(b) Find the Eigen vector for the matrix

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

corresponding to one Eigen value only.

3. (a) Verify Cayley-Hamilton theorem for the matrix

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

Also compute A^{-1}.

(b) Define Unitary matrix. Show that

$$\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$$

is unitary and find its inverse also.

UNIT–II

4. (a) The equation $x^4 - 16x^3 + 86x^2 - 176x + 105 = 0$ has two roots whose sum is 8. Find all the roots of it.

(b) Solve the equation $x^4 - 9x^2 + 4x + 12 = 0$, given that it has a multiple root.

5. (a) Reduce the cubic $2x^3 - 3x^2 + 6x - 1 = 0$ to the form $Z^3 + 3HZ + G = 0$ where H and G are integers.

(b) If α, β, γ are the roots of $x^3 - x - 1 = 0$, show by transforming technique that

$$\frac{1+\alpha}{1-\alpha} + \frac{1+\beta}{1-\beta} + \frac{1+\gamma}{1-\gamma} = -7.$$

UNIT–III

6. (a) Solve $9x^3 + 6x^2 - 1 = 0$ by Cardan's method.

(b) Solve the equation $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$ by Ferrari's method.

7. (a) Prove that, if n is an integer, the product $n(n - 1)(2n - 1)$ is divisible by 6.

(b) Define greatest common divisor of two integers and find it for the two integers 595 and 252. Also express it as a linear combination of these integers.

7. Change the voice : 8

(i) Madhur paints a picture.

(ii) I had scored three centuries in that match.

(iii) Has he lost his keys ?

(iv) Why is the teacher punishing the students ?

(v) Keep sitting.

(vi) He gave her some money.

(vii) The washerman irons the clothes.

(viii) The result will surprise you.

Unit IV

8. Write a detailed note on Consonant Sounds of English. 8

9. Transcribe the following words with primary stress : 8

(i) Island (ii) Prism

(iii) Poor (iv) Draw

(v) Foolish (vi) Chair

(vii) Shoe (viii) Reach.

Roll No. ..... Total Pages : 04

BSIT/M-24 26103

COMMUNICATION SKILLS (ENGLISH)-II

BSIT-201

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Queston)

1. Write short notes on the following : 4×2=8

(i) What are diphthong sounds ? How many diphthong sounds does English have ?

(ii) Write in brief the objectves of commercial/business correspondence.

(iii) Correct English grammar requires agreement between Subject and Verb. How ?

(iv) What is a salutation in business letters ?

Unit I

2. Elaborate upon the 7Cs of effectve business communicaton. 8

3. Give in detail the correct structure and format of a business letter. 8

Unit II

4. You are Tanu/Tashi Verma, the Librarian of Chandigarh Public School. Write a letter to the marketng Manager of Pragati Book House, New Delhi, ordering books for the school library. 8

5. Write a Precis of the following passage and also assign a suitable topic. 8

Soapy was homeless and usually in the pleasant summer nights, he slept on a bench in a park. However, as the nights got colder with approaching winter, he decided to move to his regular hangout during winter. There were several charitable places for the homeless in the New York City where Soapy could sleep during the frosty winter. But these establishments had numerous strict regulations and the authorities were highly inquisitve of the personal life of its inmates. So Soapy chose the prison at Blackwell's on the island as his winter haunt.

It was easy to get entry into his winter resort because all Soapy had to do is break some trivial law and he was inside with no questions asked. His plan was to go to an expensive restaurant have some exorbitantly priced dishes. When he could not pay the bill, the officials would escort

him straight to his trusted winter abode. Having smartened himself up with a clean shave and a wearing a coat handed out to him long back by a philanthropist. he stealthily entered abrestaurant hoping that none of the waiters would notice his tattered trousers and shoes. He decided to order a mallard duck with a bottle of White Burgundy and other luxuries. Regrettably for Soapy. as soon as he got into a grand restaurant, the chief waiter noted his ratty trousers and drove him out of the restaurant.

Unit III

6. (a) Insert a/an/the wherever necessary : 8

(i) .....Man is mortal.

(ii) We enjoyed.....breakfast she gave us.

(iii) My hen laid.....egg.

(iv) I saw.....boy in the playground.

(b) Fill in the blanks with the correct form of the verb given in the bracket :

(i) He usually.....(read) a good book at breakfast.

(ii) No one.....(listen) from him for the past six days.

(iii) Geeta.....(pass) her exam in 2021.

(iv) Perhaps, he.....(be) in time for lunch.

(b) Given $\sum_{x=1}^{10} f(x) = 500426$, $\sum_{x=4}^{10} f(x) = 329240$, $\sum_{x=7}^{10} f(x) = 175212$ and $f(10) = 40365$. Find the value of $f(1)$. 4

9. (a) Use Lagrange's interpolation formula to fit a polynomial to the following data :

x	−1	0	2	3
$f(x)$	−8	3	1	12

Hence or otherwise find the value of $f(1)$. 4

(b) Prove that the nth divided differences of a polynomial of nth degree are constant. 4

Roll No. ..... Total Pages : 04

BSIT/M-24 **26104**

MATHEMATICAL FOUNDATION FOR INFORMATION TECHNOLOGY-II

BSIT-202

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. (a) Show that the equation $a_4x^4 + a_3x^3 + a_2x^2 + a_1x - 5 = 0$ has no root in (0, 1) where $a_i \in (0, 1)$ for all $i = 1, 2, 3, 4$. 2

(b) Define the order of convergence of an iterative method. 2

(c) What is the iterative formula for Runga-Kutta method of fourth order ? 2

(d) Construct the difference table and find fifth term of the series 3, 6, 11, 18. 2

Unit I

2. (a) Find a real positive root of $x^3 - 9x + 1 = 0$ using bisection method correct to three places of decimal. 4

(b) Explain Regula-Falsi method for finding a real root of an equation $x^3 - 4x - 9 = 0$. 4

3. (a) Find the order of convergence of Newton-Raphson method. 2

(b) Show that the sequence $x_{i+1} = \frac{1}{2} x_i \left[3 - \frac{x_i^2}{a}\right]$ has convergence of second order with the limit $\sqrt{a}$. 6

Unit II

4. (a) Apply Gauss elimination method to solve the following equations : 4

$$4x + y + 3z = 11$$
$$3x + 4y + 2z = 11$$
$$2x + 3y + z = 7$$

(b) Solve the following equations by Gauss-Jordan method : 4

$$3x - 5y + z = 6$$
$$2x + 4y + z = 1$$
$$x + 2y + 2z = -2$$

5. Solve the following equations by triangularization method : 8

$$3x_1 + 2x_2 + 7x_3 = 4$$
$$2x_1 + 3x_2 + x_3 = 5$$
$$3x_1 + 4x_2 + x_3 = 7$$

Unit III

6. (a) Solve the following equations by Gauss-Seidel method : 4

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$

(b) Apply Runge-Kutta fourth order method to find an approximate value of y when $x = 0.2$, given that $\frac{dy}{dx} = x + y$ and $y = 1$, when $x = 0$. 4

7. Given that $\frac{dy}{dx} = x + y^2$ and $y = 1$ at $x = 0$. Find an approximate value of y at $x = 0.5$ by Euler's modified method (taking step size $h = 0.1$). 8

Unit IV

8. (a) The values of $f(x)$ for $x = 0, 1, 2\ldots\ldots, 6$ are given by :

x	$f(x)$
0	2
1	4
2	10
3	16
4	20
5	24
6	38

Estimate the value of $f(3.2)$ using only four of the given values. 4

Roll No. ..... Total Pages : 02

BSIT/M-24 **26105**

APPLICATIONS OF EM WAVE

BSIT-203

Time : Three Hours] [Maximum Marks : 40

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

1. (a) What do you mean by fading ? Discuss its types. 2

(b) Show voltage and current distribution, as well as its radiation pattern of Marconi Antenna. 2

(c) What is feed point impedance ? 2

(d) What is Azimutal Angle for a satellite ? 2

Unit I

2. How is Sky wave propagated ? Discuss the effect of different layeres of Ionosphere on sky wave propagation. 8

3. (a) Discuss Space wave propagation. Also explain Super-refraction in atmospheric duct. 4

(b) What do you mean by multipath Propagation ? How fading can be minimized with it ? 4

Unit II

4. (a) Discuss bandwidth and beamwidth as applied to the two major parameters of an antenna. 4

(b) An antenna has a radiation resistance of 72 ohm, a loss resistance of 8 ohm and a power gain of 16. What efficiency and directivity does it have ? 4

5. (a) What do you mean by resonant and non-resonant antenna ? Discuss in detail. 5

(b) What are the effects of ground on Antenna ? 3

Unit III

6. What is dipole array ? Discuss (a) Broadside array and (b) conceptualized radiation pattern in detail. 8

7. Discuss in detail about Folded Dipole Antenna. What are its applications ? 8

Unit IV

8. What do you mean by remote sensing through satellite ? Discuss its applications. 8

9. Discuss orbital inclination change. Derive an expression for delta V_i. 8

Unit IV

8. What is a Schottkey TTL logic ? Explain the working of Schottkey TTL logic with the help of circuit diagram. How is it different from TTL logic and what is its merit over simple TTL logic ? 8

9. What is CMOS logic ? Explain the working of NAND gate and NOR gate CMOS logic with the help of circuit diagrams. Compare NMOS logic and CMOS logic families. 8

Roll No. ..... Total Pages : 04

BSIT/M-24 26106

DIGITAL ELECTRONICS-I

BSIT-204

Time : Three Hours] [Maximum Marks : 40

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

1. Write short notes on the following :
   (a) What is signed and unsigned magnitude representation in binary number system ? Represent 23 and –23 in binary number system ?
   (b) What is an Exclusive-OR gate ? Make its truth table.
   (c) Why are the disadvantages of DTL logic as compared to TTL logic ?
   (d) Define fan-in and fan-out for a logic gate. 4×2=8

Unit I

2. (a) Determine the values of P,Q,R and S : 4
   (i) $(110101)_2 = (P)_{10}$
   (ii) $(1011.001)_2 = (Q)_{10}$
   (iii) $(898)_{10} = (R)_2$
   (iv) $(106.05)_{10} = (S)_2$

(b) Convert the following decimal numbers into OCTAL system numbers and then from OCTAL system number into binary system numbers :

(i) 785 (ii) 976 4

3. (a) Convert the following binary numbers into OCTAL system numbers and then from OCTAL system number into decimal system numbers :

(i) 10110011

(ii) 01010111.0110001 4

(b) Convert the following decimal numbers into BCD codes :

(i) 689 (ii) 2337.87 2

(c) Explain Gray codes. Write gray codes for all possible combinations of 4-variables. 2

Unit II

4. (a) Design a 2-input OR gate using PN diodes. Make its equivalent symbol and explain its working with the help of its truth table. 4

(b) Prove the following Boolean Identities :

(i) $A + A'B = (A + B)$

(ii) $(A + B)(A + B') = A$ 4

Note: A' represents complement of A.

5. (a) What is a K-Map ? Minimize the given Boolean expression using K-Map and implement the minimized function using NAND gates only. 6

$F(A,B,C,D) = \Sigma (0, 1, 3, 4, 5, 8, 11, 12) + \phi (6, 9, 13)$

(b) Design OR gate and an INVERTER using NAND gate. 2

Unit III

6. (a) What is a RTL logic ? Explain the working of RTL logic with the help of circuit diagram. What are its merits and de-merits ? 5

(b) Define V_{IL} and V_{IH} with the help of voltage level diagram for a logic family. 3

7. (a) What is a HTL logic ? Explain the working of HTL logic with the help of circuit diagram. What are its merits and demerits ? 5

(b) Define the following terms for a logic family :

(i) Propagation Delay

(ii) Figure of Merit

(iii) Power Dissipation. 3

Roll No. ..... Total Pages : 03

BSIT/M-24 **26107**

ELECTRONIC COMMUNICATION–II

BSIT-205

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. (a) Define ASK and draw its conceptual view. 2
   (b) What are different types of error control codes ? 2
   (c) Define Hamming distance and weight of the code. 2
   (d) What do you understand by discrete message ? 2

Unit I

2. (a) Describe the generation of binary FSK signal. How the FSK signal is detected ? 6
   (b) What are the differences between pulse and digital modulation technique ? 2
3. Explain the modulation and demodulation techniques in QPSK in detail. 8

Unit II

4. (a) What are the types of error present in digital communication and define parity check matrix ? 4

   (b) Design a linear block code with a minimum distance of three and a message block size of eight bits. 4

5. (a) The generator matrix for a (6, 3) block code is given below. Find all code vectors of this code.

$$G = \left[\begin{array}{ccc:ccc} 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{array}\right]. \quad 6$$

   (b) What are the important aspects of error control coding ? 2

Unit III

6. (a) Explain the algebric structure of cyclic codes in detail. 4

   (b) Design an encode for (7, 4) binary cyclic code generated by $1 + x + x^3$ and verify its operation using the message vector 0101. 4

7. (a) Explain and draw the $(n - k)$ syndrome calculation for the (n, k) cyclic code. 4

   (b) The generator polynomial of a (7, 4) cyclic code is $g(x) = 1 + x + x^3$. Find the code word of the 1010 using systematic form. 4

Unit IV

8. Discuss the Shanon-Fano coding and apply it with the following messages ensemble :

$$[X] = [X_1 \quad X_2 \quad X_3 \quad X_4 \quad X_5 \quad X_6]$$

$$[P] = [0.30 \quad 0.25 \quad 0.15 \quad 0.12 \quad 0.08 \quad 0.10]. \quad 8$$

9. Explain the Shanon-Hartley theorm and its complications. 8

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BSIT/M-24 26108

PROGRAMMING TECHNIQUES

BSIT-206

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. Write short notes on the following : 4×2=8

(a) What are types of basic logic structure in Pseudo code ?

(b) Write an algorithm to sum 15 numbers.

(c) Write steps to implement an algorithm ?

(d) Explain Cell,Worksheet and Workbook in Excel.

Unit I

2. (a) Explain Decision Table with example.

(b) What is Program Planning, its meaning and use ? 4×2=8

3. (a) Explain various types of symbols used to draw flowchart and its rules.

(b) What is Flowchart ? What are its advantages and disadvantages ? 4×2=8

Unit II

4. (a) What is efficiency of an Algorithm ?

(b) Explain Program verification in detail. 4×2=8

5. (a) Define algorithm and its representation.

(b) What are the qualities of good algorithm ? 4×2=8

Unit III

6. (a) Design an algorithm to generate Fibonacci sequence.

(b) Write and algorithm for factorial computation.

4×2=8

7. (a) Design an algorithm for reversing the digit of an number.

(b) Design an algorithm for square root of a number.

4×2=8

Unit IV

8. (a) Explain various steps to create macro in excel.

(b) Explain different types of charts in excel. 4×2=8

9. Write short notes on the following : 2×4=8

(a) Page Orientation

(b) Columns and Rows

(c) Sort

(d) AVG and SUM.

(b) Find the Mobius transformation which maps the points $z_1 = 2$, $z_2 = i$, $z_3 = -2$ into the points $w_1 = 1$, $w_2 = i$, $w_3 = -1$. **2½/4**

9. (a) Find the image of the region in 1st quadrant of z-plane bounded by the axes and the circles $|z| = a$, $|z| = b (a > b > 0)$ under the transformation $w = z^2$. **2½/4**

(b) Find the image of upper half of w-plane under the transformation $w = \left(\frac{z - ic}{z + ic}\right)^2$, where c is a real number. **2½/4**

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GSQ/M-24 **1742**

REAL AND COMPLEX ANALYSIS

BM-361

Time : Three Hours] [Maximum Marks : B.A. 27, B.Sc. 40

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory.

(Compulsory Question)

1. (a) State Duplication formula. **1/2**

(b) Evaluate $\int_0^1 x^3 (1-x)^{4/3}\, dx$. **2/2**

(c) Define critical points. **1/1**

(d) Find the angle of rotations at $z = 2 + i$ for the transformation $w = z^2$. **2/2**

(e) Define Conformal Mapping. **1/1**

Section I

2. (a) Prove that $u = e^x + \log y + xyz$, $v = \log x + e^y + xyz$ are not functionally dependent. **2½/4**

(b) Prove that :

$$\Gamma\left(n+\frac{1}{2}\right)=\frac{\sqrt{\pi}\Gamma(2n+1)}{2^{2n}\Gamma(n+1)}.$$ 2½/4

3. (a) Using Dirichlet's theorem, find the volume bounded by the surface :

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^4}{c^4}=1.$$ 2½/4

(b) Evaluate the following integral by changing the order of integration :

$$\int_0^\infty\int_x^\infty \frac{e^{-y}}{y}dy\,dx.$$ 2½/4

Section II

4. (a) Find the Fourier expansion of $f(x)=x$ in the interval $[-\pi, \pi]$. 2½/4

(b) Obtain the Fourier series expansion for the function f given by :

$$f(x)=\begin{cases}x-\pi, & \text{for } -\pi<x<0\\ \pi-x, & \text{for } 0<x<\pi\end{cases}$$ 2½/4

5. (a) Find the half-range cosine series for the $f(x)=x(\pi-x)$ in the interval $(0,\pi)$. Hence deduce that :

$$\frac{\pi^2}{6}=\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\ldots\ldots$$ 2½/4

(b) Find the Fourier series of x^2 in $(-\pi, \pi)$. Use Parseval's identity, to prove that :

$$\frac{\pi^4}{90}=1+\frac{1}{2^4}+\frac{1}{3^4}+\ldots\ldots$$ 2½/4

Section III

6. (a) Prove that the function $f(z)=\bar{z}$ is nowhere differentiable but continuous everywhere in the complex plane. 2½/4

(b) Prove that an analytic function with constant modulus is constant. 2½/4

7. (a) Show that $u=\frac{1}{2}\log\left(x^2+y^2\right)$ is harmonic and find its harmonic conjugate. 2½/4

(b) If $f(z)$ is a regular function, prove that :

$$\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\left|f(z)\right|^2=4\left|f'(z)\right|^2.$$ 2½/4

Section IV

8. (a) Show that the transformation $w=\frac{1}{z}$ maps a circle in z-plane to a circle in w-plane or to a straight line if the circle in z-plane passes through the origin. 2½/4

9. (a) Every finite dimensional vector space is an inner product space. **3,5**

(b) A linear operator T on a unitary space V is Hermitian iff $\langle T(v), v \rangle$ is real for every v. **2,3**

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GSQ/M-24 1743

LINEAR ALGEBRA

BM-362

Time : Three Hours] [Maximum Marks : B.A. : 26, B.Sc. : 40

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. 1 is compulsory.

Compulsory Question

1. (a) Show that a map $T : R^3 \rightarrow R^2$ defined by $T(x, y, z) = (|x|, y - z)$ is not a linear transformation. **1½,2**

(b) Give an example to show that union of two subspace need not be a subspace. **1½,2**

(c) Show that the function $T : R^3 \rightarrow R^3$ defined by $T(x, y, z) = x^2 + y^2 + z^2$ is not a linear transformation. **1½,2**

(d) Find the matrix representing the transformation $T : R^2 \rightarrow R^3$ defined by $T(x, y) = (x + y, 2x - y, 7y)$ relative to the standard basis of R^2 and R^3. **1½,2**

Unit I

2. (a) A non-empty subset W of a vector space V(F) is a subspace of V iff $au + bv \in W$ for $a, b \in F$ and $u, v \in W$. 2½,4

(b) Prove that :
$S = \{(1, 0, 0), (1, 1, 0), (1, 1, 1), (0, 1, 0)\}$ spans the vector space $R^3(R)$ but is not a basis set. 2½,4

3. (a) If a vector v is a linear combination of the set of n vectors $\{v_1, v_2, \ldots, v_n\}$, then the set of vectors $\{v_1, v_2, \ldots, v_n, v\}$ form a linearly dependent set. 2½,4

(b) If a finite dimensional vector space V(F) is a direct sum of its two subspaces W_1 and W_2, then dim $V = \dim W_1 + \dim W_2$. 2½,4

Unit II

4. (a) If $T : U(F) \rightarrow V(F)$ is a linear transformation, then $\dim(R(T)) + \dim(N(T)) = \dim U$. 3,5

(b) Let $T : U(F) \rightarrow V(F)$ be a linear transformation. If $v_1, v_2, \ldots, v_n$ are linearly independent vectors of U and T is one-one, then $T(v_1), T(v_2), \ldots, T(v_n)$ are also linearly independent. 2,3

5. (a) State and prove Fundamental theorem of vector space homomorphism. 3,5

(b) If W is any subset of a vector space V(F), then $A(W) = A(L(W))$. 2,3

Unit III

6. (a) Find the matrix representing the transformation $T : R^3 \rightarrow R^4$ defined by $T(x, y, z) = (x + y + z, 2x + z, 2y - z, 6y)$ relative to the standard basis of R^3 and R^4. 3,5

(b) Let $T_1 : U \rightarrow V$ and $T_2 : V \rightarrow W$ be two linear transformation. Then $\rho(T_2T_1) \leq \rho(T_2)$. 2,3

7. (a) Find the co-ordinates of vector (1, 1, 1) relative to basis (1, 1, 2), (2, 2, 1), (1, 2, 2). 3,5

(b) Prove that similar matrices have same characteristic polynomial. 2,3

Unit IV

8. (a) State and prove CAUCHY SCHWARZ INEQUALITY. 3,5

(b) If x and y are vectors in an inner product space V(F), then show that $x = y$ iff $\langle x, z\rangle = \langle y, z\rangle$ for all $z \in V$. 2,3

(b) Find the pressure of a body resting on a horizontal plane moving vertically upwards with acc. f. 2(2)

(c) Define central force and central orbit. 2(2)

(d) State Newton's second and third law of motion. 2(1)

Roll No. 2010 22463 Total Pages : 04

GSQ/M-24 1744

DYNAMICS

BM-363

Time : Three Hours] [Maximum Marks : B.Sc. 40, B.A. 27

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **9** is compulsory.

Unit I

1. The tangential acceleration of a particle moving along a circle of radius a if λ times the normal acceleration. If the speed at a certain time is u, prove that it will return to the same point after a time $\frac{a}{\lambda n}\left(1-e^{-2\pi\lambda}\right)$. 8(5)

2. (a) To a passenger in an open car travelling at 20 km/hr, the wind appears to come from a direction 60° to the right and from a head at 4 km/hr. What is the true direction and velocity of the wind ? 4(2½)

(b) A particle moves with S.H.M. in a straight line. In the first second after starting from rest, it travels

distance 'a' and in the next second it travels distance 'b' in the same direction. Find the amplitude of the motion. 4(2½)

Unit II

3. Prove that the shortest time from rest to rest in which a steady load nW tons can lift a weight W tons through a vertical distance h ft is $\sqrt{\frac{znh}{g(n-1)}}$. 8(5)

4. (a) If the string of an Atwood's machine can bear a strain of only $\frac{1}{4}$ of the sum of two weights, show that the least possible acceleration is $\frac{1}{\sqrt{2}}g$. 4(2½)

   (b) Show that the K.E. of a particle of mass m moving with velocity V is $\frac{1}{2}mV^2$. 4(2½)

Unit III

5. A particle slides down the outside of a smooth vertical circle starting from rest at the highest point. Discuss the motion. 8(5)

6. (a) Find the velocity and direction of projection of shot which passes in a horizontal distance over the top of a wall 64 ft. high and 192 ft. distant from the gun. 4(2½)

   (b) A body is projected at an angle α to the horizon so as to clear two walls of equal height a at a distance $2a$ from each other. Show that the range is $2a\cot\frac{1}{2}\alpha$. 4(2½)

Unit IV

7. (a) Find the differential equation of central orbit in pedal form. 4(2½)

   (b) If v_1 and v_2 are the linear velocities of a planet when it is respectively nearest and farthest from the Sun, prove that $(1-e)v_1 = (1+e)v_2$. 4(2½)

8. A particle moves in an Ellipse under a central force which is always directed towards its focus to find, law of force, the velocity at any point of its path and the periodic time. 8(5)

Unit V

(Compulsory Question)

9. (a) If the tangential and normal acceleration of a particle is equal prove that velocity varies as e^{ψ}. 2(2)

Roll No. ..... Total Pages : 03

GSQ/M-24 1747

SOLID STATE AND NANO PHYSICS

Paper : XI (PH-601)

Time : Three Hours] [Maximum Marks : 40

Note : Q. No **1** is compulsory. Four more questions are to be attempted, selecting *one* question from each Unit. Use of Scientific (Non-programmable) calculator is allowed.

1. (a) What is Wigner-Sietz primitive cell ? 2

(b) What is the usefulness of rotating and powder methods ? 2

(c) What are type-I and type-II superconductors ? 2

(d) Discuss the main challenges in molecular manufacturing of nano-structures. 2

Unit I

2. (a) Derive an expression for interplanar spacing. Calculate interplanar spacing for a simple cubic (SC), BCC and FCC systems. 6

(b) Calculate packing fraction for FCC crystal system. 2

3. (a) What do you understand by a space lattice, unit cell, primitive and nonprimitive cell ? 5

(b) What are Miller Indices ? Write down their important features. 3

Unit II

4. (a) Write the reciprocal lattice of a single cubic lattice and show that reciprocal lattice is itself a simple cubic lattice with lattice constant 1/a, where a is the side of the cube. 4

(b) Prove that a vector drawn from the origin to a point (h, k, l) of reciprocal lattice is normal to the (hkl) plane of the direct lattice. 4

5. (a) Discuss diffraction of X-rays and Bragg's Law. Derive Laue equation for X-ray diffraction by crystals. 6

(b) Primitive translation vector in a direct lattice are : 2

$$\vec{a} = 3\hat{i};\ \vec{b} = 2\hat{j} \text{ and } \vec{c} = \hat{k}$$

Obtain the reciprocal lattice vector.

Unit III

6. (a) Explain the following : 6

(i) Meissner's effect

(ii) A.C. Josephson effect

(b) What are high-Tc superconductors ? Give some examples. 2

7. (a) What is Pippard's Theory ? Explain it. 6

(b) What is isotopic effect in superconductivity ? 2

Unit IV

8. (a) What is quantum size confinement effect ? 2

(b) What is Scanning Electron Microscopy (SEM) ? Draw a neat and clean schematic diagram of SEM and explain its construction and working. 6

9. (a) What are carbon nanotubes (CNT) ? Discuss about SWCNT and MWCNT. Also list some important properties of CNTs. 6

(b) Explain the changes in optical properties of a material on nanoscale. 2

Roll No. ..... Total Pages : 03

GSQ/M-24 1748

ATOMIC AND MOLECULAR SPECTROSCOPY

PH-602

Time : Three Hours] [Maximum Marks : 40

Note : Attempt any *Five* questions including Question No. 1 which is compulsory. Select *one* question from each unit. Non-programmable calculator is allowed.

(Compulsory Question)

1. (a) Determine the possible terms of a one-electron atom corresponding to $n = 2$. 2

(b) What is fine structure ? What is its cause ? 2

(c) Find the possible values of resultant angular momentum for two electrons having $j_1 = 3/2$ and $j_2 = 5/2$. 2

(d) Give difference between anomalous Zeeman effect and PaschenBack effect. 2

Unit I

2. Explain the significant of quantum numbers in the theory of atom. How are they related ? Can the principal quantum number be zero ? 8

3. (a) Describe the spatial quantization one of the main features of vector atom model. 3

   (b) Explain Sommerfeld's Relativity correction. 5

Unit II

4. Calculate the energy for the penetrating orbit and show that quantum defect is a function of azimuthal quantum number. 8

5. What is the cause of level splitting in alkali metals ? Show that s-levels are singlet but all others are doublet. 8

Unit III

6. Derive the terms arsing for *pd* electron configuration in *jj*-coupling. Show that number of terms for the *pd* configuration is the same for L-S and jj-coupling. 8

7. What is meant by equivalent and non-equivalent electrons ? Derive the spectral terms arising out of five equivalent *p* electrons. 8

Unit IV

8. What is stark effect ? Explain the strong field stark effect in hydrogen. Mention the selection rules used in it. 8

9. What is Raman Effect ? Explain its Quantum theory. How does it differ from Compton effect ? Give its importance also. 8

Roll No. ..... Total Pages : 03

GSQ/M-24 1749

INORGANIC CHEMISTRY (TH)

Paper : XVIII

CH-304

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. **1** is compulsory.

(Compulsory Question)

1. (i) Which is stronger acid HF and HI ?

(ii) Write the conjugate of HSO_4^-.

(iii) What are Porphyrins ?

(iv) Name the disease caused due to lack of Iodine.

(v) Give one example of four electron donor ligand.

(vi) Give the IUPAC name of $Fe(CO)_5$.

(vii) What is oxidation state of phosphorous in Phosphazene ?

(viii) Write the IUPAC name of $[Si(CH_3)_2O]$. **8×1=8**

Section A

2. (a) Explain the Lux-Flood concept of acids and bases with examples. **3**

(b) What are the levelling and differentiating solvents ? Explain with examples. 3

3. (a) What are hard and soft acids and bases ? Give examples. 3

(b) Discuss HSAB principle and its applications. 3

4. (a) What are organometallic compounds ? Give the structures of organometallic compounds formed by 5 and 6 electron donor unsaturated molecules. 2

(b) Which compounds follow EAN rule : 2

(i) $Cr(CO)_6$

(ii) $Co(\pi\text{-}C_2H_5)_2$?

(c) How would you increase the stability of metal alkyl compounds ? 2

5. (a) What is Zeise's salt ? Draw its structure and discuss its salient features. 3

(b) Give one method of preparation of metal carbonyls. Explain the bonding in metal carbonyls. 3

Section B

6. (a) Discuss the role of alkaline earth metal in biological process. 3

(b) Draw a cyclic process showing the roles of Hb and Mb as O_2 and CO_2 transporters. 3

7. (a) Iron (II) salts undergo easy oxidation in air, but Fe (II) is not oxidised in haemoglobin and myoglobin. Explain. 2

(b) Explain the phenomenon of Co-operativity. 2

(c) What is Bohr effect ? 2

8. (a) What are Silicones ? How are these silicones prepared ? 3

(b) Discuss the factors affecting the nature of silicones polymers. What are the uses of silicones polymers ? 3

9. (a) How is cyclic $(NPCl_2)_3$ prepared ? Give an account of its nucleophilic substitution reaction. 3

(b) Discuss the nature of bonding in phosphazenes. 3

(b) Explain the application of phase rule in the extraction of silver from an ore of lead. 2

(c) Calculate the degrees of freedom of Pb-Ag system at the eutectic point. 1

8. (a) Derive thermodynamically the relation : 3

$$\Delta T_f = K_f \times m,$$

where m is molality of the solution.

(b) 10 g of a substance were dissolved in 250 ml of water and the osmotic pressure of the solution was found to be 600 mm of mercury at 15°C. Find the molecular weight of the substance. 2

(c) What are azeotropic mixtures ? 1

9. (a) Giving reasons, arrange the following aqueous solutions in the order of ascending values of their osmotic pressure :

(i) 0.1 M Na_3PO_4 solution

(ii) 0.1 M Sugar solution

(iii) 0.1 M $BaCl_2$ solution

(iv) 0.1 M KCl solution 2

(b) Taking a suitable example, explain why some solutions have negative deviations. 2

(c) What do you mean by molal elevation constant of a solvent ? How is it related to the latent heat of vaporization of the solvent ? 2

Roll No. ..... Total Pages : 04

GSQ/M-24 1750

PHYSICAL CHEMISTRY(TH)

Paper : XIX

CH-305

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. 1 is compulsory. Use of Log-table and Non-programming calculator is allowed.

Compulsory Question

1. Answer the following :

(a) What is Born-Oppenheimer approximation ? 1

(b) Write the required expression showing the relationship between entropy and thermodynamics probability. 1

(c) What are photochemical reactions ? 1

(d) Give *one* example of a photochemical reaction in which the quantum yield is very high. 1

(e) Define Gibbs Phase Rule. 1

(f) What is meant by the term 'Phase' ? 1

(g) Define Ideal and Non-Ideal solutions. 2

Section A

2. (a) Derive an expression for translational partition function of a particle. 3

   (b) What is Statistical Mechanics ? What are the two main points of difference between classical statistical mechanics and quantum statistical mechanics ? 3

3. (a) What do you understand by quantum yield of a photochemical reaction ? How is it determined experimentally. ? 3

   (b) Explain the term photosensitization by giving two examples. 2

   (c) Comment on the free energy change of a photochemical reactions giving reason. 1

4. (a) Differentiate between fluorescence and phosphorescence. Draw the Jablonski diagram depicting these processes. 3

   (b) A certain system absorbs 3×10^{18} quanta of light per second. On irradiation for 20 minutes, 0.003 mole of the reactant was found to have reacted. Calculate the quantum yield for the process. 2

   (c) Define Stark-Einstein law of photochemical equivalence. 1

5. (a) What is meant by 'Thermodynamic Probability' ? Illustrate with an example. 2

   (b) Write expression for Maxwell-Boltzmann distribution law taking degeneracy of states into consideration. What do different symbols signify ? 2

   (c) Calculate the wavelength of the radiation (in Å) if the value of an einstein of energy is 72 kcal/mol. 2

Section B

6. (a) Explain the term 'Component' as used in Phase Rule by giving two suitable examples. 2

   (b) Calculate the total number of variables for a system of C components distributed among P phases. 2

   (c) Draw a well labelled phase diagram of water system. 2

7. (a) Give *two* examples each of the following two component systems in which : 3

   (i) the components do not react with each other

   (ii) the components react to form a compound with congruent melting point

   (iii) the components react to form a compound with incongruent melting point.

Roll No. ..... Total Pages : 03

GSQ/M-24 1751

CHEMISTRY

(Theory)

Organic Chemistry

Paper : XX-CH-306

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. **1** is compulsory.

Compulsory Question

1. (a) Why α-hydrogens are more acidic in acetylacetone as compared to acetone ?

(b) Write Ring expansion reaction of Indole.

(c) What are essential and non-essential amino acids ? Give *one* example of each.

(d) What are condensation polymers ? Give *one* example also. 2×4

Section A

2. (a) Explain the process of Malonic Ester Synthesis (MES). 3

(b) Give the factors affecting the relative amounts of keto and enol forms in keto-enol tautomerism. 3

3. (a) Synthesize the following from Ethyl acetoacetate : 3
   (i) n-Valeric Acid
   (ii) 4-Methyl-2-pentanone.
   (b) Write the reactions for : 3
   (i) Reduction of Isoquinoline with H_2/Pt
   (ii) Furan to Furoic Acid.

4. (a) Discuss the mechanism of electrophilic substitution reactions in Quinoline. Also explain the orientation of incoming electrophile. 4
   (b) Explain the molecular orbital picture of Thiophene. 2

5. (a) Compare the basic character of pyridine, piperidine and pyrrole. 3
   (b) Explain the reaction and mechanism for Fischer Indole Synthesis. 3

Section B

6. (a) How can we separate different amino acids by Electrophoresis ? 3
   (b) Explain the effect of pH on the structure of α-amino acids. 3

7. (a) Write a note on Globular and Fibrous proteins. 3
   (b) Explain the process of N-terminal residue analysis. 3

8. Prepare and write the uses of :
   (a) Styron 2
   (b) PAN 2
   (c) Buna-N 2

9. (a) Explain Ziegler Natta polymerization. Also give its advantages. 3
   (b) What are Natural, Synthetic and Semi-synthetic polymers ? Give examples also. 3

Roll No. ..... Total Pages : 02

GSQ/M-24 1754

BOTANY

Paper I

Biochemistry and Plant Biotechnology

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all. All questions carry equal marks. Draw well Labeled diagrams where necessary.

Compulsory Question

1. Answer any *eight* of the following :
   (a) Which is called as stress hormone in plants ?
   (b) Define Apoenzyme.
   (c) What is Denitrification ?
   (d) Define Vector.
   (e) What is Epinasty ?
   (f) Define Totopotency.
   (g) What are Jumping genes ?
   (h) Role of Nitrogenase Enzyme.
   (i) What are Conjugated lipids ? 8

Unit I

2. Define Enzyme, its types and discuss the process of regulation of enzyme activity in detail with suitable examples. 8

3. (a) Write history of discovery and mechanism of action of Gibberellins. 4

   (b) Write Physiological functions and Mechanism of action of Auxin. 4

4. Discuss structure, functions and mobilization of fatty acids in detail. 8

5. Explain Phytochromes with its physiological role and mechanism of action. 8

Unit II

6. Write short notes on the following :

   (a) cDNA library 4

   (b) Gene delivery methods 4

7. Discuss the importance of reductase and its regulation. 8

8. Write short notes on the following :

   (a) Ammonium assimilation 4

   (b) Marker genes. 4

9. Discuss Tools and techniques of recombinant DNA technology. 8

Roll No. ..... Total Pages : 03

GSQ/M-24 1755

ECONOMIC BOTANY

Paper : II

Botany

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory (short answer type questions). All questions carry equal marks (8 marks each).

Compulsory Question

1. Answer the following : 1×18=8

(a) What do you mean by Pulses ? Give two examples.

(b) What is Brown Rice ?

(c) The 'eye' of Potato represents..... .
(fill the gap)

(d) On the basis of origin, what kind of fibers is found in Cotton ?

(e) What is 'Ratooning' ? With which crop it is associated ?

(f) What do you mean by 'Lancing' ?

(g) Green, Black, Oolong, Brick etc. are trade names of which crop ?

(h) Give botanical names and families of any two timber yielding plants.

Unit I

2. (i) Write a note on Botanical Characters and uses of Maize.

   (ii) Provide an account of Cultivation and uses of Pea. 4+4=8

3. Write notes on the following : 4+4=8

   (i) Botanical characters of Potato.

   (ii) Cultivation, harvesting and uses of Tomato.

4. (i) Write a botanical and Economical note on Jute.

   (ii) What is Linen ? Write the botanical information of the plant source and outline the processing required to obtain it. 4+4=8

5. Give brief account of the following : 4+4=8

   (i) Cultivation and uses of Groundnut.

   (ii) Botanical Features, Cultivation and Harvesting of Coconut.

Unit II

6. Discuss the following : 4+4=8

   (i) Harvesting and uses of Turmeric.

   (ii) Botanical features and usage of Cloves.

7. Write notes on the following : 4+4=8

   (i) Processing and useful properties of Coffee.

   (ii) Botanical characters of Sugarcane, emphasizing the useful part. Also discuss its cultivation process.

8. Write notes on the following : 4+4=8

   (i) Cinchona

   (ii) Medicinal significance of *Atropa* and *Rauvolfia*.

9. Give an account of the following : 4+4=8

   (i) Energy Plantations

   (ii) Biofuels.

Roll No. ..... Total Pages : 03

GSQ/M-23 1756

Aquaculture and Pest Management-II

Paper : I

Zoology

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Section A and B. Q No. **1** is compulsory.

1. Answer the following in about **20** words each : **10×1.5=15**

(a) Brackish water culture

(b) Polyculture

(c) Reservoir Fishery

(d) Largest Riverine System of India

(e) Fin fishes

(f) Lacustrine Fisheries

(g) Zoological name of The Vegetable Mite.

(h) Damage causing stage of Red Cotton Bug

(i) Systematic Position of Sugarcane Leaf Hopper

(j) Dead Hearts.

Section A

2. Describe the following : 2+4¼

   (a) EEZ Concept

   (b) Ecology of a Lake

3. Give a detailed account of Five River Systems of India. 6¼

4. Describe the various types of Fishing Crafts. 6¼

5. Describe the process of the following : 3+3¼

   (a) Prawn culture

   (b) culture of Molluscs.

Section B

6. Describe systematic position, damage caused, life-cycle and control measure of Pectinophora gossypiella. 6¼

7. Give zoological name, morphological features, nature of damage caused and control measure of Red Pumpkin Beetle. 6¼

8. Write Zoological name, systematic position and damage caused of : 3+3¼

   (a) Gurdaspur Borer

   (b) Sugarcane whitefly.

9. What is the zoological name, systematic position, habits, damage caused and life-cycle of Gundhi bug. 6¼

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GSQ/M-24 1757

AQUACULTURE AND PEST MANAGEMENT-II

Paper : II

Zoology

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory and answer to each part should not exceed 20 words each. Attempt *two* questions from Section A and two questions from Section B. Draw well labelled diagrams wherever they are required.

Compulsory Question

1. (a) Define the term "fish seed".

(b) What are planktophagus fish ? Give an example

(c) What is RAS ?

(d) What is monoculture in aquaculture ?

(e) Define cryopreservation.

(f) Write the Zoological name of "Dhora".

(g) What are fumigants ?

(h) What is a parasitoid ?

(i) What is IPM ?

(j) Name any two rodent pests of crop. **1.5×10=15**

Section A

2. What are natural fish seed resources ? Explain different natural fish seed resources of India and collection methods. **6.25**

3. Write notes on the following : **3.0+3.25=6.25**
   (a) Polyculture
   (b) Cryopreservation.

4. (a) Discuss the components and characteristics of an efficient artificial fish feed.
   (b) Explain the categories of fishes on the basis of their feeding niches, variety and availability of natural food. **3.0+3.25=6.25**

5. Describe in detail the induced breeding with pituitary gland extraction. **6.25**

6. Write notes on the following : **3.0+3.25=6.25**
   (a) Cage Culture
   (b) Running water culture.

Section B

7. Write notes on the following : **3.0+3.25=6.25**
   (a) Nature of damage and habits of Wheat weevil
   (b) Nature of damage and habits of Grain and Flour moth.

8. Explain the systematic position, habits, life-cycle and nature of damage of Pulse Beetle. **6.25**

9. Write notes on the following : **3.0+3.25=6.25**
   (a) Use of pheromones and hormones in Insect Pest Management
   (b) Significance and problems of biological control.

10. Define the following : **3.0+3.25=6.25**
    (a) Components of IPM
    (b) Characteristics of an ideal pesticide.

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GSQ/M-24 **1760**

ELECTRONICS

Paper : I (Theory)

Microprocessor Architecture and Programming-II

Time : Three Hours] [Maximum Marks : 40

Note : There are Nine questions in this paper. All questions carry equal marks. Attempt *Five* questions in all. Q. No **1** is compulsory. Attempt remaining *four* questions by selecting *one* question from each Unit.

1. (a) What do you mean by Maskable and Non-Maskable interrupt ? 2

(b) Write a control word when the ports of 8255 are defined as follows :
Port A and Port B as Output port in mode 1, Port C_{UP} as an Input port and Port C_{Low} as an Output port. 2

(c) Write the control word format for 8253. 2

(d) How the programming of 8257 DMA controller is done ? 2

Unit I

2. (a) Discuss the bit pattern for RIM instruction. 2

   (b) Explain the operation of the interrupts structure of the 8085, with the help of a circuit diagram. 6

3. (a) Discuss EI and DI instructions. 3

   (b) What is an Interrupt ? What are hardware interrupts ? What is meant by Vectored interrupts ? 3

   (c) How is the INTR interrupt used in 8085 ? 2

Unit II

4. (a) Mention, various modes of operations of 8255A and explain it working in BSR mode. Explain also its control word format. 6

   (b) Obtain the control word for the following configuration of the ports of 8255 A for Mode 0 operation: Port A and port B as output ports and port C_{Lower} as output port; and port C_{upper} as input port. 2

5. Draw the block diagram of Programmable Peripheral Interface IC 8255 and explain the function of each block. 8

Unit III

6. (a) Explain, how 8253 can be used as square wave generator ? 3

   (b) Discuss, how 8253 can be used as hardware triggered strobe ? 3

   (c) Explain, how 8253 can be used as programmable mono shot ? 2

7. Draw the schematic block diagram of programmable interval timer (PIT) 8253 and explain its working in detail. 8

Unit IV

8. Discuss the design of microprocessor based Temperature controller which can maintain the temperature of a device constant. Write program in assembly language of 8085. 8

9. Write program in assembly language of 8085 to control the different function of washing machine. 8

Roll No. ..... Total Pages : 03

GSQ/M-24 1761

ELECTRONICS

Paper : II (Theory)

Introduction to C and Its Programming

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

1. (a) What are the advantages of high level languages over machine language ?

(b) Give any *two* differences between a While statement and a Do-while statement in C.

(c) Explain, why functions are important in writing a program ?

(d) Name and describe *four* basic data types in C. 4×2=8

Unit I

2. (a) Explain the different ways and rules in which floating points can be written. 4

(b) What is the use of conditional operator to form the conditional expression ? How is a conditional expression evaluated ? 4

3. (a) Describe two logical operators in C. What is purpose of each ? With what types of operands can they be used ? 4

(b) Define Array Variable. Differentiate between Ordinary variable and Array Variable. 4

Unit II

4. (a) Explain if, if-else, nested if-else and cascaded if-else with examples and syntax. 4

(b) Explain the meaning of Cast operator with the help of suitable example. 4

5. (a) Show, how break and continue statements are used in a C-program, with example. 4

(b) Write a program to find the HCF of the two numbers using do while loop. 4

Unit III

6. (a) Write a function which, given a number from 1 to 12 and a character array, stores the name of the month in the array. For example, given 8, it stores August in the array. Store the empty string if the number given is not valid. 5

(b) Explain the meaning of each of following : 3

(i) int f(int a);

(ii) double f(double a, int b);

7. (a) Write a program to find the sum of 7 numbers using Functions. 4

(b) Write a function that, given two date structures, d1 and d2, returns -1 if d1 comes before d2, 0 if d1 is the same as d2, and 1 if d1 comes after d2. 4

Unit IV

8. (a) While passing an argument to a function, what is the difference between passing by the value and passing by reference. 4

(b) Explain the meaning of the following Declaration : 4

(i) float a = – 0.167;
float *pa = & a;

(ii) char c1, c2, c3;
char *pc1, *pc2, *pc3 = &c1;

9. (a) Explain the different types of strings used in C. How are strings initialized ? 3

(b) What is Pointer ? What kind of information is represented by pointer variable ? 3

(c) What is the difference between passing by the value and passing by reference ? Give suitable examples. 2

Roll No. ..... Total Pages : 05

GSQ/M-24 1762

COMPUTER SCIENCE

Paper I

Relational Database Management System

Time : Three Hours] [Maximum Marks : B.A. : 25, B.Sc. : 40

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. 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 ।

Compulsory Question (अनिवार्य प्रश्न)

1. (a) Who was Dr. E. F. Codd ? List the rules proposed by Dr. Codd. **1/1½**

डॉ. ई. एफ. कॉड कौन थे ? डॉ. कॉड द्वारा प्रस्तावित नियमों की सूची बनाइए ।

(b) Write a note on transitive functional dependency. **1/1½**

सकर्मक कार्यात्मक निर्भरता पर एक टिप्पणी लिखिए ।

(c) What are the different data types used in SQL ? 1/1½
एस.क्यू.एल. में उपयोग किए जाने वाले विभिन्न डाटा प्रकार क्या हैं ?

(d) Differentiate between primary and unique key. 1/1½
प्राथमिक और अद्वितीय कुंजी के बीच अंतर कीजिए ।

(e) Write a note on PL/SQL Character set. 1/2
पी.एल./एस.क्यू.एल. कैरेक्टर सेट पर एक टिप्पणी लिखिए।

Unit I (इकाई I)

2. What do you mean by data model ? Discuss features and component of Network data model with an illustration. Differentiate among hierarchical, network and relational data models. 5/8
डाटा मॉडल से आपका क्या तात्पर्य है ? एक उदाहरण के साथ नेटवर्क डाटा मॉडल की विशेषताओं और घटकों पर चर्चा कीजिए । पदानुक्रमित, नेटवर्क और संबंधपरक डाटा मॉडल के बीच अंतर कीजिए ।

3. (a) Define entity, attribute and relationship in relational model. Write about different types of attributes.
संबंधपरक मॉडल में इकाई, विशेषता और संबंध को परिभाषित कीजिए ? विभिन्न प्रकार की विशेषताओं के बारे में लिखिए।

(b) Why do we need relational algebra ? Discuss select, project and Cartesian product operations with an example. 2.5+2.5=5/4+4=8
हमें संबंधपरक बीजगणित की आवश्यकता क्यों है ? एक उदाहरण सहित चयन, परियोजना और कार्टेशियन प्रोडक्ट ऑपरेशन पर चर्चा कीजिए ।

Unit II (इकाई II)

4. (a) Differentiate between tuple relational and domain relational calculus.
टपल रिलेशनल और डोमेन रिलेशनल कैलकुलस के बीच अंतर कीजिए ।

(b) What is functional dependency ? Differentiate between full and partial functional dependency. 2.5+2.5=5/4+4=8
कार्यात्मक निर्भरता क्या है ? पूर्ण और आंशिक कार्यात्मक निर्भरता के बीच अंतर कीजिए ।

5. Explore the role of normalization in designing of database. Write the properties of normalization. How BCNF is simpler and stronger that 3NF ? Explain with example. 5/8
डाटावेस के डिजाइनिंग में सामान्यीकरण की भूमिका का अन्वेषण कीजिए । सामान्यीकरण के गुण लिखिए । बी.सी.एन.एफ. 3एन.एफ. से कितना सरल और मजबूत है ? उदाहरण सहित समझाइए ।

Unit III (इकाई III)

6. (a) Write the SQL statement to sort data in ascending and descending order.
डाटा को आरोही और अवरोही क्रम में क्रमबद्ध करने के लिए एस.क्यू.एल. स्टेटमेंट लिखिए ।

(b) How do you implement left, right and outer join in SQL ? State example. **2.5+2.5=5/4+4=8**
आप एस.क्यू.एल. में बाएं, दाएं और बाहरी जुड़ाव को कैसे लागू करते हैं ? उदाहरण बताइए ।

7. (a) Write the following SQL statements with purpose, syntax and example :

(i) Insert Statement

(ii) Drop Statement.

निम्नलिखित एस.क्यू.एल. कथनों को उद्देश्य, वाक्यविन्यास और उदाहरण के साथ लिखिए :

(i) कथन सम्मिलित करना

(ii) ड्रॉप स्टेटमेंट ।

(b) How do you implement the following in SQL :

(i) Table level Foreign Key constraint

(ii) Check and Like constraint. **2.5+2.5=5/4+4=8**
आप एस.क्यू.एल. में निम्नलिखित को कैसे कार्यान्वित करते हैं :

(i) तालिका स्तर विदेशी कुंजी बाधा

(ii) बाधा की जाँच कीजिए और पसंद कीजिए ।

Unit IV (इकाई IV)

8. Differentiate between SQL and PL/SQL. Explore the PL/SQL block structure. How do you declare and assign variables in PL/SQL ? **5/8**
एस.क्यू.एल. और पी.एल./एस.क्यू.एल. के बीच अंतर बताइए । पी.एल./एस.क्यू.एल. ब्लॉक संरचना का अन्वेषण कीजिए । आप पी.एल./एस.क्यू.एल. में वेरिएबल कैसे घोषित और निर्दिष्ट करते हैं ?

9. How do we use conditional control and sequential control statements in PL/SQL ? Explain with illustration. **5/8**
हम पी.एल./एस.क्यू.एल. में सशर्त नियंत्रण और अनुक्रमिक नियंत्रण कथन का उपयोग कैसे करते हैं ? उदाहरण सहित समझाइए ।

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GSQ/M-24 1828

DIETETICS-II

Course 311

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

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

Compulsory Question (अनिवार्य प्रश्न)

1. Define the following terms : 4×2=8

   (a) NIDDM

   (b) Heart diseases

   (c) Nephritis

   (d) Chronic renal failure.

   निम्नलिखित शर्तों को परिभाषित कीजिए :

   (अ) एन.आई.डी.डी.एम.

   (ब) हृदय रोग

   (स) नेफ्रैटिस

   (द) क्रोनिक रीनल फेलर ।

Unit I (इकाई I)

2. (a) Differentiate between IDDM and NIDDM. 4
आई.डी.डी.एम. और एन.आई.डी.डी.एम. के बीच अंतर बताइए।

(b) Write nutritional management in diabetes mellitus. 4
मधुमेह में पोषण प्रबंधन लिखिए ।

3. Write a detailed note on symptoms and nutritional management in Hypertension. 8
उच्च रक्तचाप के लक्षण और पोषण प्रबंधन पर एक विस्तृत टिप्पणी लिखिए ।

4. Write down the causes; symptoms and prevention of Heart diseases. 8
हृदय रोगों के कारण, लक्षण एवं बचाव लिखिए ।

5. Elaborate the dietary modification and nutritional management in Ischemic heart disease. 8
इस्केमिक हृदय रोग में आहार संशोधन और पोषण प्रबंधन का विस्तार से वर्णन कीजिए ।

Unit II (इकाई II

6. Discuss in detail about the dietary management in cancer. 8
कैंसर में आहार प्रबंधन के बारे में विस्तार से चर्चा कीजिए ।

7. What are the symptoms and dietary management in chronic renal failure ? 8
क्रोनिक रीनल फेल्योर में लक्षण और आहार प्रबंधन क्या हैं ?

8. Write a detailed note on symptoms and dietary management in nephritis. 8
नेफ्राइटिस में लक्षण और आहार प्रबंधन पर एक विस्तृत टिप्पणी लिखिए ।

9. Elaborate the cause and dietary management in kidney stones. 8
गुर्दे की पथरी के कारण और आहार प्रबंधन को विस्तार से बताइए।

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Total Pages : 03

GSQ/M-24

1829

TRADITIONAL TEXTILES, EMBROIDERIES AND CONSUMERISM

Course 312

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

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

Compulsory Question (अनिवार्य प्रश्न)

1. Define the following terms : 4×2=8

   (a) Labeling aid

   (b) Value addition

   (c) Motifs used in Kantha embroidery

   (d) Tie and Dye.

   निम्नलिखित शब्दों को परिभाषित कीजिए :

   (अ) लेबलिंग सहायता

   (ब) मूल्यवर्धन

(स) कांथा कढ़ाई में प्रयुक्त रूपांकन

(द) टाई एण्ड डाई ।

Unit I (इकाई I)

2. Write short notes on the following : 2×4=8

(a) Kalamkari Painting of Andhra Pradesh

(b) Manipuri Embroidery.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) आंध्र प्रदेश की कलमकारी पेंटिंग

(ब) मणिपुरी कढ़ाई ।

3. Explain the techniques applied in preparing Bandhani Textiles. 8

बंधनी वस्त्र तैयार करने में प्रयुक्त तकनीकों की व्याख्या कीजिए ।

4. From where did the Chikankari originate ? Write the various types of stitches, motifs used. 8

चिकनकारी की उत्पत्ति कहाँ से हुई ? उपयोग किए गए विभिन्न प्रकार के टांके, रूपांकनों को लिखिए ।

5. List various Traditional Textiles. Explain Jamdani Sarees in detail. 8

विभिन्न पारंपरिक वस्त्रों की सूची बनाइए । जामदानी साड़ियों के बारे में विस्तार से बताइए ।

Unit II (इकाई II

6. Explain in detail the current scenario of textile market. 8

कपड़ा बाजार के वर्तमान परिदृश्य को विस्तार से समझाइए ।

7. What are the determining points to selecting the clothing or textile ? 8

कपड़े या वस्त्र के चयन के निर्धारण बिंदु क्या हैं ?

8. How special finished add the value in fabrics ? Explain with any *two* examples. 8

कैसे विशेष फिनिशिंग कपड़ों में मूल्य वृद्धि करती है ? किन्हीं दो उदाहरणों से समझाइए ।

9. What is influence consumption of textiles in today ? Describe. 8

आज वस्त्रों की खपत पर क्या प्रभाव पड़ रहा है ? वर्णन कीजिए ।

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GSO/M-24 **1830**

ADULTHOOD GUIDANCE AND COUNSELLING

Course-313

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

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

Compulsory Question (अनिवार्य प्रश्न)

1. (i) Which of the following lifestyle factors are known to affect well-being positively in late adulthood ?

(a) Mental and physical activity, nutrition

(b) Alcohol consumption and retiring early

(c) Drug consumption, mental and physical activity

(d) None of these

निम्नलिखित में से कौनसा जीवनशैली कारक देर से वयस्कता में स्वास्थ्य को सकारात्मक रूप से प्रभावित करने के लिए जाना जाता है ?

(अ) मानसिक और शारीरिक गतिविधि, पोषण

(ब) शराब का सेवन और जल्दी सेवानिवृत्त होना

(स) नशीली दवाओं का सेंवन, मानसिक और शारीरिक गतिविधि

(द) उपर्युक्त में से कोई नहीं

(ii) The best way to help students do well in their studies is through :

(a) Guidance and Counselling

(b) Punishment

(c) Rigid and Strict Discipline

(d) None of the above

छात्रों को उनकी पढ़ाई में अच्छा प्रदर्शन करने में मदद करने का सबसे अच्छा तरीका है :

(अ) मार्गदर्शन और परामर्श

(ब) सजा

(स) कठोर और सख्त अनुशासन

(द) उपर्युक्त में से कोई नहीं

(iii) A blood test can help to confirm if you are beginning menopause. The test measures the level of which of these ?

(a) Follicle-stimulating hormone

(b) Estrogen

(c) Progesterone

(d) Cholestrol

रक्त परीक्षण यह पुष्टि करने में मदद कर सकता है कि क्या आपकी रजोनिवृत्ति शुरू हो रही है । परीक्षण इनमें से किसके स्तर को मापता है ?

(अ) कूप-उत्तेजक हार्मोन

(ब) एस्ट्रोजन

(स) प्रोजेस्टेरोन

(द) कोलेस्ट्रॉल

(iv) Which of the following is an objective of the guidance ?

(a) It assists the students in developing a better attitude towards school attitude

(b) It assists the children to adapt to the school transitions and regulations of the school

(c) It enables the students to identify their problems

(d) All of the above

निम्नलिखित में से कौनसा मार्गदर्शन का उद्देश्य है ?

(अ) यह छात्रों को स्कूल के रवैये के प्रति बेहतर दृष्टिकोण विकसित करने में सहायता करता है

(ब) यह बच्चों को स्कूल के बदलावों और नियमों के अनुकूल ढलने में सहायता करता है

(स) यह छात्रों को उनकी समस्याओं की पहचान करने में सक्षम बनाता है

(द) उपर्युक्त सभी

(v) What does the term 'population ageing' mean ?

(a) The trend for the youngest age groups in society to grow faster than the oldest age group

(b) The trend for the middle-aged groups in society to grow faster than the oldest age groups.

(c) The trend for the oldest-age groups in society to grow faster than the oldest age groups.

'जनसंख्या वृद्धावस्था' शब्द का क्या अर्थ है ?

(अ) समाज में सबसे कम आयु वर्ग की प्रवृत्ति सबसे अधिक उम्र वाले आयु वर्ग की तुलना में तेजी से बढ़ने की है

(ब) समाज में मध्यम आयु वर्ग के समूहों की प्रवृत्ति सबसे पुराने आयु समूहों की तुलना में तेजी से बढ़ने की है

(स) समाज में सबसे अधिक उम्र वाले समूहों की प्रवृत्ति सबसे अधिक उम्र वाले समूहों की तुलना में तेजी से बढ़ने की है

(vi) Which of the following is not an element of counseling ?

(a) Interview

(b) Confidence

(c) Professional Growth

(d) Commmunication

निम्नलिखित में से कौनसा परामर्श का एक तत्व नहीं है ?

(अ) साक्षात्कार

(ब) आत्मविश्वास

(स) व्यावसायिक विकास

(द) संचार

(vii) What is not a characteristics of counseling ?

(a) Effective building

(b) Opportunity for free expression

(c) Counsellor's Invovment

(d) Personal Interview

परामर्श की विशेषता क्या नहीं है ?

(अ) प्रभावी रचना

(ब) स्वतंत्र अभिव्यक्ति का अवसर

(स) काउंसलर का आह्वान

(द) व्यक्तिगत साक्षात्कार

(viii) At about what age does menopause typically begin ?

(a) 40

(b) 45

(c) 51

(d) 55 **1×8=8**

रजोनिवृत्ति आमतौर पर किस उम्र में शुरू होती है ?

(अ) 40

(ब) 45

(स) 51

(द) 55

Unit I (इकाई I)

2. Discuss the following : 8

   (a) Developmental task of young adulthood

   (b) Societal and vocational development in young adulthood.

   निम्नलिखित पर चर्चा कीजए :

   (अ) युवा वयस्कता का विकासात्मक कार्य

   (ब) युवा वयस्कता में सामाजिक और व्यावसायिक विकास ।

3. Discuss the physical changes and health problems in old age. 8

   वृद्धावस्था में होने वाले शारीरिक परिवर्तनों और स्वास्थ्य समस्याओं पर चर्चा कीजिए ।

4. Explain the following : 8

   (a) Retirement

   (b) Grandparenthood.

   निम्नलिखित को स्पष्ट कीजिए :

   (अ) सेवानिवृत्ति

   (ब) ग्रांडपेरेन्टहुड ।

5. What is Mid life crisis ? Explain Menopause in Women. 8

   मध्य जीवन संकट क्या है ? महिलाओं में रजोनिवृत्ति को समझाइए ।

Unit II (इकाई II)

6. Elaborate the skill and characteristics of effective counselor. 8

   प्रभावी परामर्शदाता के कौशल और विशेषताओं का विस्तार से वर्णन कीजिए ।

7. Discuss various methods and techniques in counseling of children and parents. 8

   बच्चों और अभिभावकों की काउंसलिंग में विभिन्न तरीकों और तकनीकों पर चर्चा कीजिए ।

8. Explain the objectives and approaches of individual and group guidance. 8

   व्यक्तिगत और समूह मार्गदर्शन के उद्देश्यों और दृष्टिकोणों की व्याख्या कीजिए ।

9. What do you mean by guidance ? Discuss the principles of guidance and counseling. 8

   मार्गदर्शन से आप क्या समझते हैं ? मार्गदर्शन एवं परामर्श के सिद्धांतों पर चर्चा कीजिए ।

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INTERIOR DECORATION

Course : 314

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

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

Compulsory Question (अनिवार्य प्रश्न)

1. Define the following in 2-3 lines each : **2×4=8**

(a) Color

(b) Table setting

(c) Lighting

(d) Soft furnishings.

निम्नलिखित प्रत्येक को 2-3 पंक्तियों में परिभाषित कीजिए :

(अ) रंग

(ब) टेबल सेटिंग

(स) प्रकाश व्यवस्था

(द) मुलायम साज-सज्जा ।

Unit I (इकाई I)

2. What are Elements of Art ? How are these applied in the interior decoration of house ? 8

कला के तत्त्व क्या हैं ? इन्हें घर की आंतरिक साज-सज्जा में कैसे लगाया जाता है ?

3. Write down the properties and classification of colors. 8

रंगों के गुण एवं वर्गीकरण लिखिए ।

4. Explain the different types of flowers arrangements for different areas in the home. 8

घर के विभिन्न क्षेत्रों के लिए विभिन्न प्रकार की फूलों की व्यवस्था की व्याख्या कीजिए ।

5. Discuss the different types of table settings. 8

विभिन्न प्रकार की टेबल सेटिंग्स पर चर्चा कीजिए ।

Unit II (इकाई II)

6. Discuss the different types of lighting. 8

विभिन्न प्रकार की प्रकाश व्यवस्था पर चर्चा कीजिए ।

7. How will you take care of different types of furniture ? 8

आप विभिन्न प्रकार के फर्नीचर की देखभाल कैसे करेंगे ?

8. What points will you keep in mind while selecting furniture for low income group ? 8

निम्न आय वर्ग के लिए फर्नीचर का चयन करते समय आप किन बातों को ध्यान में रखेंगे ?

9. Explain wall and floor coverings. 8

दीवार और फर्श कवरिंग के बारे में बताइए ।

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BAQ/M-24 **15079**

HOME SCIENCE

Paper I

Food and Nutrition

Time : Two Hours] [Maximum Marks : 27

Note : Attempt *Three* questions in all, selecting *one* question from each Unit. All questions carry equal marks.

प्रत्येक इकाई से एक प्रश्न चुनते हुए, कुल तीन प्रश्नों के उत्तर दीजिए । सभी प्रश्नों के अंक समान हैं ।

Unit I (इकाई I)

1. (a) Describe food along with its functions in detail.

भोजन का उसके कार्यों सहित विस्तार से वर्णन कीजिए ।

(b) Write the daily allowances, effects of deficiency and excess of Vitamin A and Sodium in detail. 3+6

विटामिन A और सोडियम की दैनिक खुराक, कमी और अधिकता के प्रभाव को विस्तार से लिखिए ।

2. Explain the role of dietary fiber in human nutrition in detail with suitable examples. 9

मानव पोषण में आहार फाइबर की भूमिका को उपयुक्त उदाहरणों सहित विस्तार से समझाइए ।

Unit II (इकाई II)

3. Explain in detail the principles of food preservation. 9

खाद्य संरक्षण के सिद्धांतों को विस्तार से समझाइए ।

4. (a) Enlist importance of enhancing nutritive value of food stuffs.

खाद्य पदार्थों के पोषक मूल्य को बढ़ाने के महत्व को सूचीबद्ध करता है ।

(b) Describe the effects of cooking on different nutrients in detail. 4+5

विभिन्न पोषक तत्वों पर खाना पकाने के प्रभावों का विस्तार से वर्णन कीजिए ।

Unit III (इकाई III)

5. What is meal planning ? Discuss. Explain in detail different factors affecting meal planning. 9

भोजन योजना क्या है ? चर्चा कीजिए । भोजन योजना को प्रभावित करने वाले विभिन्न कारकों का विस्तार से वर्णन कीजिए ।

6. Plan a day's diet for an adult suffering from high blood pressure. Write the foods to be taken and to be avoided during high blood pressure. 9

उच्च रक्तचाप से पीड़ित वयस्क के लिए एक दिन के आहार की योजना बनाइए । उच्च रक्तचाप के दौरान लिए जाने वाले और परहेज किए जाने वाले खाद्य पदार्थों के नाम लिखिए ।

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BAQ/M-24

15080

HOME SCIENCE

Paper : II

Human Development

Time : Three Hours]

[Maximum Marks : 27

Note : Attempt *Three* questions in all, selecting *one* question from each Unit. All questions carry equal marks.
प्रत्येक इकाई से एक प्रश्न चुनते हुए, कुल तीन प्रश्नों के उत्तर दीजिए । सभी प्रश्नों के अंक समान हैं ।

Unit I (इकाई I)

1. What is the importance of Learning ? Discuss the methods of learning. 9
सीखने की क्रिया का महत्त्व क्या है ? सीखने के ढंगों की चर्चा कीजिए ।

2. What is Intelligence ? Discuss the ways to measure intelligence. 9
बुद्धि क्या है ? बुद्धि मापने के तरीकों पर चर्चा कीजिए ।

Unit II (इकाई II)

3. What is the importance of play in childhood ? 9
बचपन में खेल का क्या महत्त्व है ?

4. Describe the characteristics of childhood. 9
बाल्यावस्था की विशेषताओं की व्याख्या कीजिए ।

Unit III (इकाई III)

5. What is Weaning ? Discuss the importance of weaning. 9
पूरक आहार क्या है ? पूरक आहार के महत्त्व की चर्चा कीजिए ।

6. Discuss digestive disturbances in children. Write about diarrhoea and vomiting. 9
बच्चों में पाचन संबंधी रोगों की चर्चा कीजिए । अतिसार और वमन के विषय में लिखिए ।

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BSIT/M-24 **26115**

COMPUTER SYSTEM ARCHITECTURE–II

BSIT-601

Time : Three Hours] [Maximum Marks : 40

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

1. (a) What are various stages in a Pipeline execution ?

(b) What is non-volatile memory ? Give *one* example of it.

(c) What are system bus and memory bus in a multiprocessor ?

(d) Differentiate synchronous and asynchronous data transfer schemes. 4×2=8

Unit I

2. Explain the basic concepts of pipelining and compare it with sequence processing with a neat diagram. 8

3. What is vector processing and what are its main applications ? Explain the Matrix Multiplication Operation using vector processor in detail. 8

Unit II

4. (a) Define the following terms : 3

   (i) Read access time

   (ii) Write access time

   (iii) Memory access time.

   (b) Discuss the concept of Memory interleaving and give its advantages. 5

5. What do you mean by virtual memory and where is it used in computer architecture ? Discuss, how paging helps in implementing virtual memory. 8

Unit III

6. What are different interconnection arbitration mechanisms in a multiprocessor ? Discuss them in detail with block diagram. 8

7. Explain the following terms in respect to a multiprocessor : 8

   (a) Crossbar Switch

   (b) Multistage Switching Network.

Unit IV

4. (a) Discuss the design of a typical input or output interface. 4

   (b) Give comparison between memory mapped I/O and I/O mapped I/O schemes. 4

9. What is DMA ? Describe, how is DMA used to transfer data from peripherals. Explain in detail. 8

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BSIT/M-24 **26116**

PROGRAMMING IN C++–II

BSIT-602

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. Write short notes on the following : 4×2=8

(a) Friend Function

(b) Multilevel Inheritance

(c) Pure Virtual Function

(d) Exception.

Unit I

2. (a) Explain the difference between friend function and member function of a class. 4

(b) What is the use of friend class ? Explain with example. 4

3. Write a program to concatenate two string objects by overloading the '+' operator. 8

Unit II

4. Compare public, private and protected inheritance using an example. **8**

5. How are constructors executed in : **2×4=8**
   (a) Multiple inheritance
   (b) Multilevel inheritance ?

Unit III

6. What is virtual base class ? Why is it needed ? Explain with example. **8**

7. Write a function template to swap two numbers of different types. **8**

Unit IV

8. Write short notes on the following : **4×2=8**
   (a) seekg()
   (b) seekp()
   (c) tellg()
   (d) tellp().

9. Write a program to calculate the division of two numbers with proper exception handler to check for division by 0. **8**

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Total Pages : 02

BSIT/M-24

26117

WEBSITE DESIGN IMPLEMENTING BASIC DESIGN TOOLS–II

BSIT-603

Time : Three Hours]

[Maximum Marks : 40

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

(Compulsory Question)

1. Write short notes on the following : 4×2=8
   (a) Checkbox control and Radio button
   (b) Image as links
   (c) and elements
   (d) Class, id, universal selector.

Unit I

2. (a) What is the difference between Get and Post method ? 4
   (b) Explain <fieldset> and <legend> elements. 4
3. How to create frameset and also explain rows and cols attributes. 8

Unit II

4. Explain image maps and steps for creating client-side image maps. 8

5. Explain various ways to add Audio and Video files in the webpage. 8

Unit III

6. Explain CSS properties for text and background. 8

7. Write short notes on the following : 2×4=8
   (a) Overflow
   (b) CSS rules and comments.

Unit IV

8. What is Xml, structure of Xml and Xml syntax rules ? 8

9. Explain Xml DTD and its types with example. 8

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BSIT/M-24 **26118**

INTERNET CONCEPTS AND APPLICATIONS–II

BSIT-604

Time : Three Hours] [Maximum Marks : 40

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

1. Write short notes on the following : 4×2=8

(i) Cryptography

(ii) Online chatting

(iii) EDI

(iv) Groupware.

Unit I

2. (a) What do you mean by computer security ? State various steps to ensure computer security. 4

(b) Briefly discuss data encryption standards. 4

3. (a) What do you mean by computer virus ? State any *four* signs that indicate that your computer is virus infected. 4

(b) What do you mean by cookies ? Briefly describe any *two* types of cookies. 4

Unit II

4. Write short notes on the following : 2×4=8

(a) Multimedia and its components

(b) Multimedia authoring tools.

5. What do you mean by online conferencing ? Briefly describe its advantages and disadvantages. 8

Unit III

6. What do you mean by e-Commerce ? Briefly discuss e-commerce types: D2C, B2B, G2C and B2G. 8

7. What do you mean by EFT ? Briefly discuss its advantages and limitations. 8

Unit IV

8. (a) What do you mean by Intranet ? How does it differ from Internet ? 4

(b) Briefly describe HTTP. What is significance ? 4

9. (a) What do you mean by e-Mail ? Briefly describe software used in e-Mail. 4

(b) What do you mean by Extranet ? Discuss briefly. 4

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BSIT/M-24 **26119**

EMBEDDED SYSTEMS OF 8051 MICROCONTROLLER–II

BSIT-605

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. (a) Define Embedded System. What are the components of embedded system ? 2

   (b) List any *four* features of 8051 microcontroller. 2

   (c) Write a program to find 2's complement of a number. Save the result at RAM location 05h. 2

   (d) Why is testing required for a microcontroller design ? 2

Unit I

2. (a) Differentiate between Harvard and Princeton Architecture. 3

(b) Discuss the processor selection criteria for an embedded system. 3

(c) What are the advantages of CISC processor ? 2

3. Explain the different hardware units of embedded system. 8

Unit II

4. Explain the following of 8051 microcontroller : 8

(i) Program Counter

(ii) Data Pointer

(iii) A and B CPU registers

(iv) Flags.

5. (a) Explain internal RAM organization of 8051. 4

(b) Discuss the working of timers in all modes. 4

Unit III

6. Explain the following instructions : 8

(i) PUSH

(ii) POP

(iii) XCH

(iv) SWAP A.

7. Explain the serial data transmission of 8051 in different modes. 8

Unit IV

8. (a) What is asynchronous and synchronous data transmission ? 4

(b) What are the specifications keeping in mind while designing a microcontroller ? 4

9. (a) Discuss the timing subroutines in 8051 microcontroller design with example. 4

(b) Discuss various steps used for testing the design of 8051. 4