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

BT-2/M-14 **8201**

MATHEMATICS–II

Paper–Math-102-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Find the inverse of

$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}.$$

(b) Determine the values of λ for which the following set of equations may possess non-trivid solution :

$$3x_1+x_2-\lambda x_3=0$$

$$4x_1-2x_2-3x_3=0$$

$$2\lambda x_1+4x_2+\lambda x_3=0.$$

For each permissible value of λ, determine the general solution.

2. (a) State Cayley-Hamilton theorem, use it to find A^8 if $A=\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$.

(b) If $A=\begin{bmatrix} 2+i & 3 & -1+3i \\ -5 & i & 4-2i \end{bmatrix}$, show that AA^* is a Hermitian matrix, where A^* is the conjugate transpose of A.

UNIT–II

3. (a) Solve $2ydx+x(2 \log x-y)dy=0$.

   (b) Find the orthogonal trajectory of the family of curves $r^n=a \sin n\theta$.

4. (a) Solve $(D^2-4y+4)y=8x^2e^{2x}\sin 2x$.

   (b) Solve by the method of variation of parameters

$$\frac{d^2y}{dx^2}-2\frac{dy}{dx}+2y=e^x \tan x.$$

UNIT–III

5. (a) Find the Laplace transform :

   (i) $\left(\sqrt{t}-\frac{1}{\sqrt{t}}\right)^3$.

   (ii) $|t-1|+|t+1|$, $t \geq 0$.

   (b) Find the inverse Laplace transform of

$$\frac{s}{s^4+4a^2}.$$

6. (a) Solve by the use of Laplace transform

$$\frac{xd^2y}{dx^2}+\frac{dy}{dx}+xy=0, y(0)=2, y'(0)=0.$$

   (b) Solve the following simultaneous equation by the use of Laplace transform :

$$\frac{dx}{dt}-y=et, \frac{dy}{dt}+x=\sin t, \text{ with } x(0)=1, y(0)=0.$$

UNIT–IV

7. (a) Solve :

$$(x-y)(px-qy)=(p-q)^2.$$

   (b) Solve :

$$2z+p^2+qy+2y^2=0.$$

8. (a) Solve :

$$\frac{\partial^3 z}{\partial x^3}-2\frac{\partial^3 z}{\partial x \partial y}=2e^x+3x^2y.$$

   (b) Solve :

$$\frac{\partial u}{\partial t}=\frac{\partial^2 u}{\partial x^2}$$

with boundary conditions

$u(x, 0)=3 \sin n\pi x$ $u(0,t)=0$ and $u(1,t)=0$,

where $0<x<1$, $t>0$.

Roll No. .....

Total Pages : 2

BT-2/M-14 **8202**

PHYSICS–II

Paper–PHY-102-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Discuss the Laue X-ray diffraction method for the crystal structure analysis. 10

   (b) Prove that lattice cannot have five fold symmetry. 10

2. (a) Differentiate between Schottky and Frenkel defects in the crystal. 5

   (b) Discuss the Bravais lattice in three dimensions. 15

UNIT–II

3. (a) Explain Drude's theory of conduction. 10

   (b) Derive the expression for time dependent Schroedinger wave equation. 10

4. (a) Derive an expression for the Fermi energy of a free electron gas in one dimensions. 10

   (b) Discuss the behaviour of Fermi-Dirac distribution function with change in temperature. 10

UNIT-III

5. (a) On the basis of band theory of solids distinguish between metals, insulators and semiconductors. 10

(b) What do you mean by effective of electron and find a relation for it.

6. Explain the phenomena of Hall effect in solids and gives its applications. 20

UNIT-IV

7. (a) Explain the applications of photoconductivity and discuss the effect of traps. 10

(b) Explain the molecular field theory of ferromagnetism and formation of domains. 10

8. (a) Explain the orbital dimagnetism and show that diamagnetic materials have negative magnetic susceptibility. 10

(b) State and derive London equations. 10

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

BT-2/M-14 **8203**

INTRODUCTION TO BIOTECHNOLOGY

(w.e.f. 2009–10)

Paper–BT-101-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Describe in detail cell ultra-structure and functions of cell organelles. 20

2. Differentiate :

   (a) DNA and RNA

   (b) Prokaryotic and Eukaryotic cell. 2×10=20

UNIT–II

3. (a) Define gene and briefly describe its structure and location. 10

   (b) Discuss genetics of Type-I and Type-II diabetes. 10

4. Briefly describe process of replication, transcription and translation. 20

UNIT–III

5. Write notes on :

   (a) Plasmids as nature's interlopers

   (b) Restriction enzymes as nature's pinking shears. 2×10=20

6. What are genetically modified organisms? How are they prepared and what are the ethical issues associated with them? 20

UNIT-IV

7. (a) Define Biotechnology. Describe their salient applications in agriculture and forensic science. 10

(b) Write notes on :

(i) Nanotechnology

(ii) Bio-MEMS. 2×5=10

8. (a) How has biotechnology improved field of medicine and environment globally? 10

(b) Discuss the role of biology in information technology (Bio-information). 10

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

BT-2/M-14 **8219**

INTRODUCTION TO BIOTECHNOLOGY

Paper–BT-101-E

Option–II (2004-2008)

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Distinguish between : 5×4

   (a) Prokaryotic and Eukaryotic cell

   (b) Monosaccharides and Polysaccharides

   (c) Saturated and Unsaturated lipids

   (d) DNA and RNA.

2. (a) Write the important functions of proteins and lipids. 5

   (b) Describe general characteristics of enzymes. 5

   (c) Discuss the effect of temperature, pH and substrate concentration on enzyme activity. 10

UNIT–II

3. (a) Explain light reaction of photosynthesis with the help of diagram only. 5

(b) What is the significance of Nitrogen fixation? Which microbes help in this process. 5

(c) Draw a well labelled diagram of excretory system of Deing. 5

(d) Explain the digestive system and its importance in brief. 5

4. Write a note on "Economic importance and control of microbes". 20

UNIT-III

5. (a) State different theories of evolution, in brief. 5

(b) What do you mean by speciation? How does variation play a role in speciation. 5

(c) Describe an experiment to prove that "Nucleic acid is a genetic material". 5

(d) Define Bioinformatics and explain its future prospects. 5

6. (a) Distinguish between mitosis and meiosis with the help of suitable diagram of different stages. 15

(b) State Mendel's Laws of Inheritance. 5

UNIT-IV

7. With the help of suitable example, describe the tools used in Recombinant DNA Technology. 20

8. Write short notes on the following : 4x5

(a) Bt Cotton

(b) Transgenic Organisms

(c) Golden Rice

(d) Bioremediation

(e) Biotechnology an interdisciplinary area.

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

BT-2/M-14 **8204**

COMMUNICATION SKILLS IN ENGLISH

Paper–HUM-101-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **all** questions.

1. (a) Correct the following sentences : 10

(i) One should do his duty.

(ii) He is very sick to visit office.

(iii) Burn the lamp.

(iv) Ram is more better today.

(v) He absented from the meeting.

(vi) Ambrish is our mutual friend.

(vii) He knows driving.

(viii) Forty yards are a good distance.

(ix) The jury is divided in their opinion.

(x) Every man, woman and child were lost.

(b) Change the voice of the following : 10

(i) Do you like him?

(ii) Did Ram love her?

(iii) How will she manage it?

(iv) Ramesh is speaking the truth.

(v) Gita was feeding her baby.

(vi) The child has broken the toys.

(vii) We had taken tea.

(viii) Pinki had kicked the ball hard.

(ix) His novel is selling well.

(x) Quinine tastes bitter.

2. (a) Use the following idioms and phrasal verbs in your sentences : 5

(i) At the zenith

(ii) Down and out

(iii) Silver-lining

(iv) Make over

(v) Wear out.

(b) Differentiate the following words by making meaningful sentences : 5

Accept, Except; Allusion, Illusion; Beside, Besides; Complement, Compliment; Credible, Creditable.

(c) Give one word substitute for the following : 5

(i) A life story of a person written by himself.

(ii) A nursery where children are cared.

(iii) Something which leaves a lasting impression.

(iv) A person who hates women.

(v) One who speaks on behalf of others.

(d) Make words with the following suffixes and prefixes : 5

Mono ....., Ambi ....., Inter .....,
Retro ....., Omni ....., ...,
wise, ... some, ... ness,
..... ful, ... ward.

3. (a) Transcribe the following using IPA symbols : 5

Trodden, Petrol, Endeavour, Freedom, Wrath.

(b) Mark primary stress on the following : 5

Consent (n), Suspect (v), Perfect (v), Object (n), Advance, Laughter, Fellowship, Out dated, Weightless, Blackboard.

(c) Mark intonation in the following sentences : 5

(i) Sit over there.

(ii) If I go to bazaar, I will see your brother.

(iii) Where are you from? (Business tone)

(iv) Shut the door, will you?

(v) Very sad.

(d) Transcribe into IPA the weak forms of the words underlined : 5

(i) This is the method <u>that</u> work.

(ii) I have met <u>him.</u>

(iii) <u>Who</u> do you want?

(iv) <u>There</u> was nobody in the room.

(v) <u>The</u> apples are rotten.

4. (a) Write a slogan and supporting text spreading the message of communal harmony. 10

(b) Write a dialogue between two friends on the choice of a profession-law or medicine. 10

5. (a) Write a letter to Electrical goods supplier asking him for floating quotations at the lowest rates. 10

(b) Discuss the format of a formal report. 10

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

8206

BT-2/M-14

ELEMENTS OF ELECTRONICS ENGINEERING

Paper–EL-101-E

Time Allowed : 3 Hours] [Maximum Marks : 75

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

1. (a) Explain the operation of LED with its characteristics. 5

   (b) Explain the working of full wave bridge rectifier. 4

   (c) Explain the following terms :

   (i) PSRR

   (ii) Input-Bias current

   (iii) Slew rate. 1×3=3

   (d) Explain small signal model of JFET. 3

UNIT–I

2. (a) What do you mean by passive components? Explain with examples. 4

   (b) Explain the operation of pn-junction in forward bias region. 6

   (c) Write a short note on varactor diode. 5

3. (a) Describe mass-action law. 5

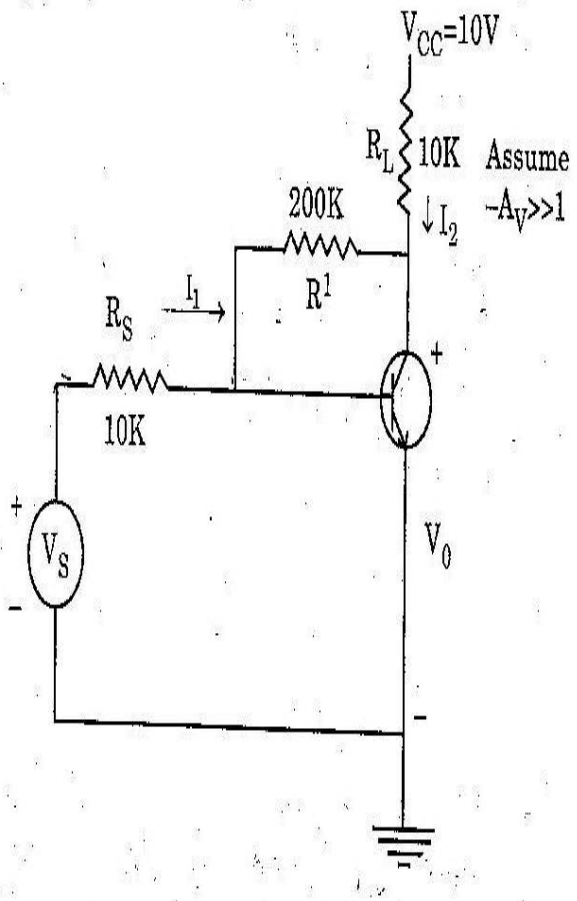
(b) Explain Zener and Avalanche breakdowns. 3+3=6

(c) Explain the circuit of voltage doubler. 4

UNIT-II

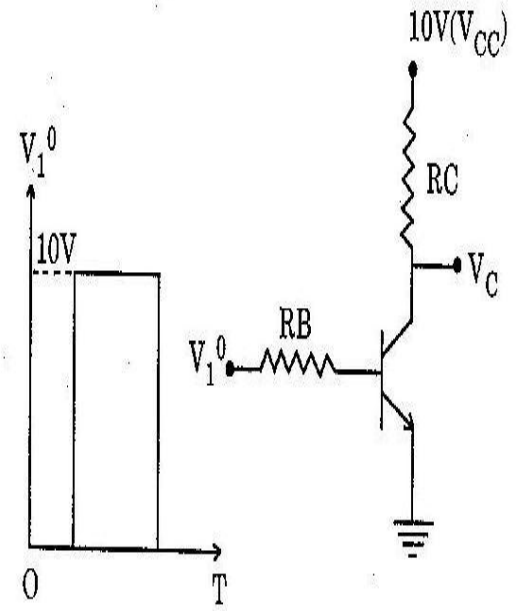
4. (a) Explain the DC analysis of common emitter configuration. 8

(b) For the amplifier shown in figure, calculate R_1^0 and R_1^1: 4+3=7



5. (a) Explain Miller's theorem. 5

(b) Determine R_B and R_C for transistor inverter of figure, if I_{Csat}=10 mA : 5+5=10



UNIT-III

6. (a) Explain the working of op-amp as a differentiator with waveforms. 7

(b) Explain the characteristics of ideal op-amp. 8

7. (a) Explain the DC operation of differential amplifier circuit. 8

(b) Explain the operation of op-amp as an adder. 7

UNIT-IV

8. (a) Explain the concept and working of UJT. 8

(b) Explain the working of common-drain n-channel JFET amplifier. 7

9. (a) Explain the pinch off voltage and Shockley's equation in detail. 7

(b) Explain the characteristic and construction of SCR. 8

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

BT-2/M-14 **8208**

ENGINEERING GRAPHICS & DRAWING

(2010-11)

Paper–ME-105-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. The least distance of a point P from reference line is 60 mm. Draw its projections if the point is placed at a height of 30 mm above H.P. Mention all assumptions regarding quadrant and scale used clearly alongside the solution. 20

2. Construct a backward Vernier scale of 1/30 to show metres, decimetres and centimetres. The scale is to be used for reading 4 m length. Mark a distance of 3 m 3 dm and 5 cm on the scale. 20

UNIT–II

3. Front view of a line PQ is inclined at 30° to XY line and measures 60 mm. The line is inclined at 45° to VP. The end P is in HP and VT of the line is 20 mm below HP. Draw the projections of the line and find its true length and inclinations with the reference planes. Also locate its HT. 20

4. A triangular plane is in the form of an isosceles triangle having hase with a 30 mm side and altitude of 40 mm. It is kept in the first quadrant such that the surface is perpendicular to both H.P. and V.P.

Draw its projections when the base is parallel to the V.P. 20

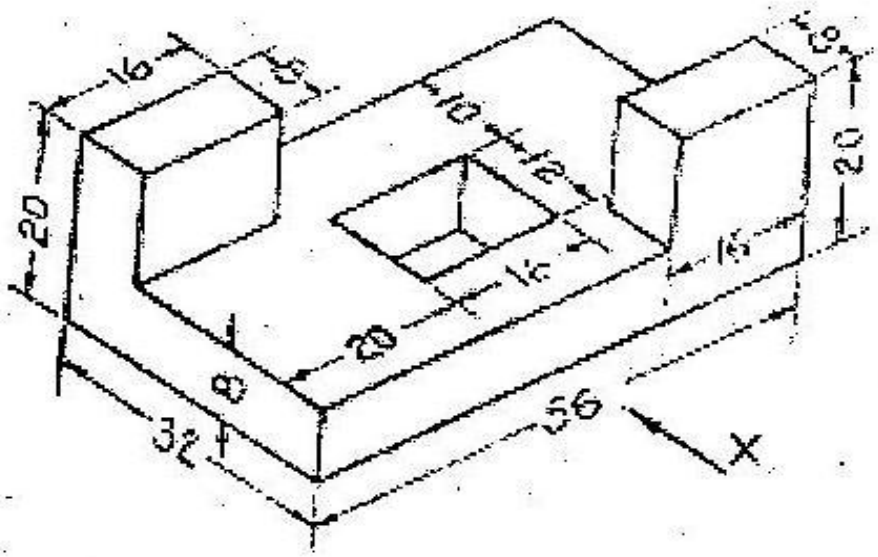
UNIT–III

5. A Tetrahedron with a 60 mm edge is resting on a face on the HP such that an edge is parallel to both HP and VP and 20 mm in front of the VP. Draw its projections. 20

6. A cube of 40 mm edge stands on one of its faces on HP with a vertical face making 45° to VP. A hole of 30 mm diameter and whose axis is perpendicular to VP and parallel to HP is drilled centrally through the cube such that the hole passes through the opposite vertical edges of the cube. Obtain the development of the lateral surface of the cube with the hole. 20

UNIT–IV

7. Draw the front view, top view and left side view of the following object : 20



8. Draw the three orthographic views of hexagonal nut and square headed bolt. 20

7. HF

Roll No. .....

Total Pages : 2

BT-2/M-14

8209

ENGINEERING GRAPHICS & DRAWING

(2010-11)

Paper–ME-105-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all.

1. (a) List the types of scales. 6

   (b) Construct a scale of 1:8, to show decimeters and centimeters and to read up to 1 m. Show a length of 7.6 dm on it. 14

2. (a) Compare third angle projection with first angle projection. Draw their symbols and show clearly the difference between the two with the help of a drawing in three views. 10

   (b) The point A is on HP and 40 mm in front of VP. Another point B is in VP and below HP. The line joining their front views makes an angle of 45° with xy while the line joining their top views makes an angle of 30°. Find the distance of the point B from HP. 10

3. A line of 100 mm long makes an angle of 35° with the HP and 45° with VP. Its mid point is 20 mm above HP and 15 mm in fron of VP. Draw the projections of the line. 20

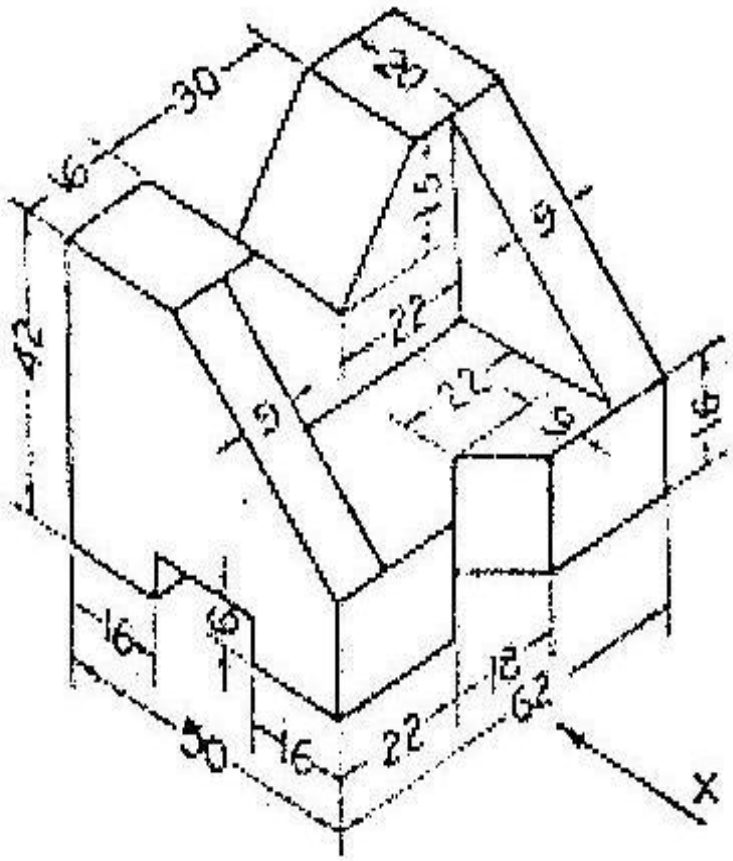
4. A regular hexagon of 25 mm side, has its one edge of HP. The surface of the plane is perpendicular to VP and inclined at 40° to HP. Draw the three views of the plane. 20

5. Draw the projections of a hexagonal pyramid, with side of base 30 mm and axis 70 mm long, which is resting with a slant face on HP such that the axis is parallel to VP. 20

6. A square pyramid with side of base 30 mm and axis 50 mm long is resting on its base on HP with an edge of the base parallel to VP. It is cut by section plane, perpendicular to VP and inclined at 45° to HP. The section plane is passing through the mid point of the axis. Draw the development of the surface of the cut pyramid. 20

7. Draw front view and side view of a square headed bolt of 24 mm diameter and 96 mm long with the hexagonal nut. 20

8. Draw the orthographic projections of the casting shown in figure below : 20



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

BT-2/M-14 **8211**

CHEMISTRY

Paper–CH-101-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Derive Gibb's-Helmholtz equation in terms of Gibb's free energy and enthalpy. 12

   (b) What are the limitations of first law of thermodynamics. Justify the need of second law. 8

2. (a) Define the following terms with suitable examples :

   (i) Phase

   (ii) Component

   (iii) Degree of freedom. 9

   (b) Draw a neat labelled phase diagram of water system and explain areas, curves and trible point in it. 11

UNIT–II

3. (a) Explain the causes of hardness of water. 3

(b) A water sample contains 204 mg of $CaSO_4$ per litre. Calculate the hardness in terms of $CaCO_3$ equivalent. 5

(c) Explain scale and sludge formation. How can scale formation be prevented by : (i) phosphate conditioning, (ii) Carbonate conditioning. 12

4. (a) What are ion-exchange resins? How will you purify water by using the resins? What are the advantages of this method over other methods? 10

(b) Write notes on :

(i) Mixed bed demineralisation

(ii) Reverse osmosis. 10

UNIT-III

5. (a) Define corrosion of metals. What are different types of corrosion? Explain the electrochemical theory of wet corrosion, giving its mechanism. 10

(b) Discuss the various (any three) factors affecting rate of corrosion. Mention different methods used to prevention of corrosion of metal. Discuss any one method. 10

6. (a) What is meant by lubricants? Explain the mechanism of lubrication. 5

(b) Write short notes on :

(i) Viscosity index

(ii) Flash point and fire point

(iii) Saponification value. 9

(c) What are various additives used in the preparation of lubricating oils? 6

UNIT-IV

7. (a) What are the effect of structure on the properties of polymers? 8

(b) How thermoplastic is differ from thermosets? How phenol-formaldehyde resin is prepared? Give its important applications. 8

(c) What are silicones? How are they prepared? 4

8. (a) What is spectrophotometry? Discuss the principle and working of a spectrophotometer with the help of a schematic diagram. 8

(b) What do you understand by titrimetric analysis? Why titrimetric methods have great advantages over gravimetric methods? 5

(c) What is flame photometry? Describe its applications and drawbacks. 2,5

Roll No. .....

Total Pages : 3

BT-2/M-14 **8212**

ELECTRICAL TECHNOLOGY

Paper–EE-101-E

Option–II

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Explain how a sinusoidal e.m.f. is generated. 10

   (b) Given (all in volts) :

   $$V_1 = 40\cos\omega t,\ V_2 = 20\sin(\omega t + 135°),$$

   $$V_3 = 80\sin(\omega t + 225°),$$

   find $V = V_1 + V_2 + V_3$. 10

2. (a) A practical coil of power factor 0.6 is in series with a 100μF capacitor when connected to 50 Hz supply, the potential difference across the coil is equal to the potential difference across the capacitor. Find the resistance and inductance of the coil. 6

   (b) Find the average and r.m.s. values of $v=V_m \sin\omega t$ for half cycle and complete cycle. 8

   (c) Compare nodal and loop methods of analyzing circuits. 6

UNIT-II

3. (a) Explain and derive the expressions for requency response of series RLC circuit and deduce the condition for resonance. 5

(b) In a series circuit a voltage of 10V at 25 Hz produces 100 mA. While the same voltage at 75 Hz produces 60 mA. Draw the circuit diagram and insert the values of constants. 15

4. (a) State the Norton's theorem and explain its importance with the help of example. 12

(b) Define the following :

(i) Q factor

(ii) Band width

(iii) Cut off frequency

(iv) r.m.s. value. 2,2,2,2

UNIT-III

5. (a) Explain 2 watt meter method of power measurement for star connected purely resistive load with the help of neat circuit and phasor diagram. 15

(b) Two watt meters are connected to measure the input to a balanced 3ϕ circuit read 5 KW respectively. Find the power factor of the circuit (i) when both the readings are positive, (ii) the later reading is obtained after reversing the connections of current coil of the watt meter. 5

6. (a) Define efficiency of a single phase transformer. Deduce the condition of for maximum efficiency. 5

(b) While performing short circuit test, rated voltage is never applied to the transformer. Why? 5

(c) In short circuit test, it is said that the iron losses are almost zero. Why? 5

(d) A 500 KVA transformer has an efficiency of 98.77% at full load at 0.8 p.f. and an efficiency of 99.13% at half load at unity p.f. Calculate the iron loss and full load copper loss. 5

UNIT-IV

7. (a) Derive the e.m.f. equation of D.C. generator. 10

(b) Explain speed control of DC Shunt motor in detail. 10

8. Compare and contrast between :

(i) Armature reaction and armature resistance

(ii) Slip ring and split ring

(iii) Squirrel cage rotor and phase would rotor

(iv) Working of Commutator in D.C. Generator and DC motor. 5,5,5,5

Roll No. .....

Total Pages : 3

BT-2/M-14

8213

FUNDAMENTALS OF COMPUTERS AND PROGRAMING IN C

Paper–CSE-101-E

Option–I

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Draw a block diagram to illustrate the basic organization of a computer system and explain the functions of the various units. 10

   (b) Write a short note on classification of computers. 5

   (c) What is an operating system? Why is it necessary for a computer system? 5

2. (a) Convert the following numbers to their binary equivalent :

   (i) $2AC_{16}$

   (ii) 2513_8

   (iii) FAC_{16}

   (iv) 652_2. 12

(b) Write the following conversions :

(i) $ABC_{16} = ?_8$

(ii) $152_6 = ?_4$ 8

UNIT-II

3. (a) What are the advantages and limitations of high level languages as compared to machine and assembly languages? 5

(b) What is an interpreter? How does it differ from a coupiler? 5

(c) Explain the following terms : 10

(i) Debugger

(ii) Linker

(iii) Loader

(iv) Assembler.

4. (a) What is FTP? List the steps involved in downloading/uploading a file by using FTP service. 10

(b) Discuss the services provided by the internet. 10

UNIT-III

5. (a) Write a program in C to calculate the factorial of a number. 10

(b) Explain the various types of loops and their applications. 10

6. (a) Differentiate between call by value and call by reference. 8

(b) What do you mean by a function? How functions are declared? Explain with example. 12

UNIT-IV

7. (a) Differentiate between structures and array. 8

(b) Write a program in C to merge the contents of the two files in the third file. 12

8. (a) Explain the different file operations. 10

(b) Write a short note on unions and enumerations. 10

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

BT-2/M-14 **8222**

ELEMENTS OF ELECTRONICS ENGINEERING

Paper–EL-101-E

(2004-2007)

Option–I

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Describe the working of Bridge Rectifier. 7

   (b) Explain Zener diode as a voltage regulator. 8

2. (a) Explain the operation of LED with its characteristics. 8

   (b) Determine V_0 for network of Fig. 1 for the input shown : 7

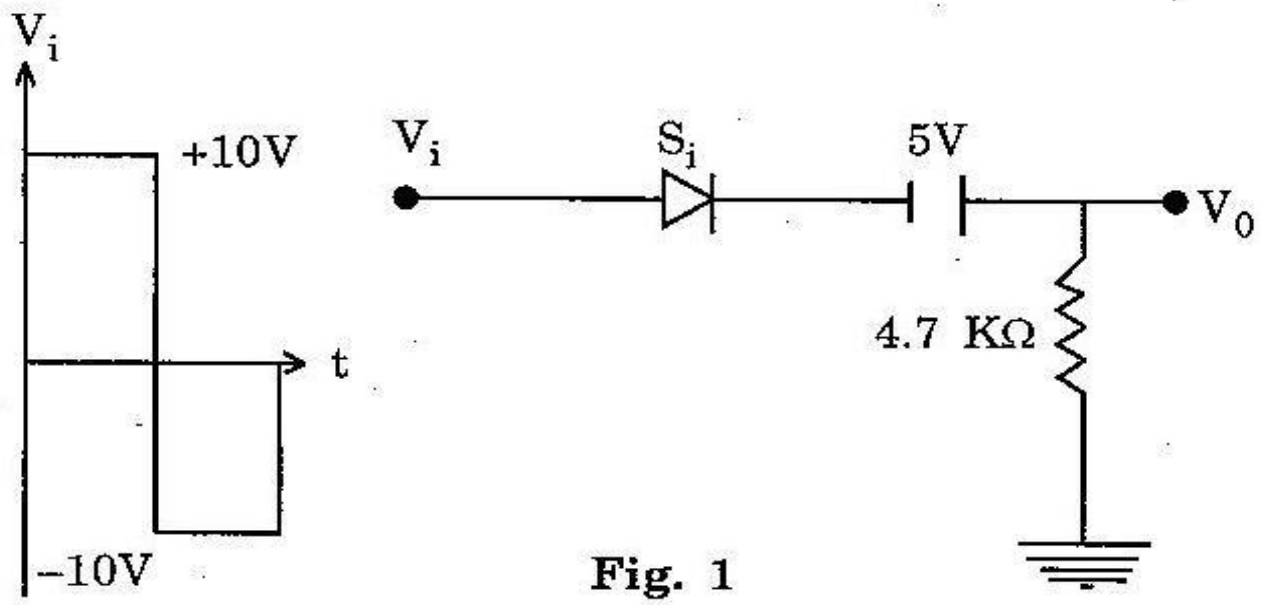


Fig. 1

UNIT-II

3. Explain the concept of d.c. and a.c. load line. How the operating point is selected? 15

4. Find h_{re} in terms of the Common Base (CB) h-parameters. Also draw the CB hybrid model. 15

UNIT-III

5. (a) Explain the operational amplifier as differentiator. 8

   (b) Describe the working of differential amplifier and its transfer characteristics. 7

6. (a) Explain the operational amplifier as an integrator. 8

   (b) List the different characteristics of ideal Op-Amps. 7

UNIT-IV

7. (a) Explain the working of UJT. 8

   (b) Draw and explain the transfer characteristics of p-channel JFET. 7

8. (a) Write a short note on TRIAC. 8

   (b) Explain the working principle of p-channel enhancement type MOSFET. 7

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

BT-2/M-14 **8210**

MANUFACTURING PROCESSES

Paper–ME-103-E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) What is an accident? Explain different types of accidents. What are the items to be kept in a first aid box? 10

   (b) What is production? Explain different types of production methods with examples. 10

2. (a) Give classification of properties of engineering materials and explain any five types of mechanical properties. 10

   (b) What are engineering materials? Give their classification. Explain composition, properties and applications of cast irons. 10

UNIT–II

3. (a) What is a pattern? With neat sketches explain different types of patterns. 10

   (b) What are the properties of moulding sand? Explain each property in detail. 10

4. Draw a neat sketch of Cupola. Label different zones and show, important parts. Explain its operation with reactions in each zone. What are the advantages and disadvantages of cupola? 20

UNIT-III

5. (a) What is recrystallisation temperature? Explain the differences between hot working and cold working. 10

   (b) Write short notes on :

   (i) Punching

   (ii) Forming

   (iii) Shearing. 10

6. (a) Explain the process of hot rolling and cold rolling with neat sketches. What type of products can be made by hot rolling? 10

   (b) What are objectives of good plant layout? Explain any one type of plant layout with a neat sketch. 10

UNIT-IV

7. (a) Draw a neat sketch of a lathe. What kind of operations can be done on a lathe? 10

   (b) Explain different types of chips. What are the mechanisms of chip formation? 10

8. (a) Briefly explain the welding defects and their remedies. 10

   (b) With neat sketches, explain different types of resistance welding. 10