T.Y.B.Sc. Electronics (Paper I)

ELE.311 Semiconductor Physics

Unit I: Crystal Structure

Questions for 2 marks

1)   Explain the term co-ordination number.
2)   Explain the term packing fraction.
3)   What is primitive translational vector?
4)   Explain the idea of unit cell.
5)   What is the atomic radius? What is the atomic radius for FCC crystals?
6)   Write the values of the packing fraction of SC and FCC.
7)   Calculate the packing fraction of BCC crystals.
8)   State the properties of reciprocal lattice.
9)   What are the Millar indices of a plane?
10)   Explain Millar Indices.
11)   Calculate Millar Indices of a plane making intercepts 6a, 2b and 6c on x, y, and axes respectively.
12)   What is reciprocal lattice?
13)   Write reciprocal lattices of SC crystals.

Questions for 4 marks

1) What is Millar Indices? What are Millar Indices of a plane making intercepts 2a, 3b, 6c on three axes.
2) Show that packing fraction of FCC and SC structures are 0.74 and 0.52 respectively.
3) Draw neat diagrams of SC and BCC structures.
4) Draw neat diagrams primitive lattice cell of SC and BCC structures.
5) Show that reciprocal of a reciprocal lattice is the original lattice.
6) Show that packing fraction for FCC is $\pi/3\sqrt{2}$.
7) Show that packing fraction for BCC is $\pi\sqrt{3}/6$.
8) What is atomic radius? Calculate atomic radius for BCC crystals?
9) Show that reciprocal lattice of FCC is the direct lattice for BCC.

(Note: Question of 4 marks may be asked for 6 marks expecting more detail answer)

Unit II: Band theory of solids

Questions for 2 marks

1) What is energy band?
2) Explain the concept of hole.
3) Explain origin of energy bands in crystals.
4) Describe in brief free electron model.
5) Draw energy band of conductors and semiconductors.
6) Draw energy band of conductors and insulators.
7) Distinguish between conductors and semiconductors.
8) What is effective mass m*?

Questions for 4 marks

1) Distinguish between conductors, insulators and semiconductors with energy band digram.
2) Discuss electronic motion according to band theory.
3) Write a note on free electron theory model.
4) Write a note on hole.
5) Show that effective mass of an electron under the influence external electric field moving in energy band is

$$m* = \frac{\hbar}{\frac{\partial^2 E}{\partial K^2}}$$

(Note: Question of 4 marks may be asked for 6 marks expecting more detail answer)

Unit III: Charge carriers in semiconductor

Questions for 2 marks

1) What is intrinsic semiconductor?
2) What is extrinsic semiconductor?
3) What is direct semiconductor? Give example
4) What is indirect semiconductor? Give example
5) What is Fermi energy?
6) Explain in short Fermi dirac distribution function against temperature.
7) What is drift carriers? Give expression.
8) Give expression of electrical conductivity.
9) Give the expression of electron concentration in conduction band.

10) Give the expression of hole concentration in valence band.
11) Explain Hall effect in material
12) Explain Hall coefficient.

Questions for 4 marks

1) Explain Fermi-dirac distribution function against temperature.
2) Derive the expression of electron concentration in conduction band.
3) Derive the expression of hole concentration in valence band.
4) Explain Hall effect with diagram.
5) Explain Fermi level and Fermi energy.
6) Derive the expression for mobility and electrons in electronic and magnetic field.
7) What is Hall effect? Obtain an expression for Hall coefficient.
8) Distinguish between direct and indirect semiconductor.

(Note: Question of 4 marks may be asked for 6 marks expecting more detail answer)

Unit IV: P-N Junction and Integrated Circuits

Questions for 2 marks

1) Give different steps in fabrication of P-N junction.
2) Mention different methods of fabrication of P-N junction.
3) Explain donar impurity.
4) Explain acceptor impurity.
5) What is the contact potential?
6) How monolithic circuits are fabricated/
7) What is merged transistor?
8) Explain forward bias P-N junction.
9) Explain reverse bias P-N junction.
10) Explain current flow at junction.

Questions for 4 marks

1) Explain Zener break down process.
2) Explain donar and acceptor impurities in semiconductors.
3) Explain the Avalaunche break down process in P-N junction.
4) Write a note on reverse break down.
5) Explain how monolithic circuits are fabricated.
6) Explain the idea of merged transistors.
7) Write a note on monolithic circuits.

8) Explain in short MOS transistors.
9) Explain how BJT is fabricated.
10)   Describe diffusion method of fabrication of P-N junction.
11)   Explain the Zener break down in reverse bias P-N junction.
12)   Explain forward and reverse bias of P-N junction.
13)   What is depletion layer in P-N junction? How does the potential barrier in the region change with doping levels.
14)   Describe in brief contact potential.

(Note: Question of 4 marks may be asked for 6 marks expecting more detail answer)

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T.Y.B.Sc. Electronics (Paper II)
ELE.312 Basic Communication Systems

Unit 1: Communication System

Questions for 2 marks
1) Define modulation. State its types.
2) What is mean by communication process? State the elements of modern communication system.
3) What are the advantages of modulation process in the modern communication system?
4) Draw only the block diagram of modern electronic communication system.
5) Define amplitude modulation.
6) Define frequency modulation.
7) Define phase modulation.
8) What do you mean by carrier wave? Give its importance in modulation process.
9) Modulation process increases the range of communication, comment.
10) Modulation process allows multiplexing of signals, comment.
11) Modulation process reduces antenna height, comment.
12) Modulation process avoids mixing of signals, comment.
13) The process of modifying a high frequency carrier in accordance with the low frequency modulating signal is called as _____.
14) A signal, with which original electrical information sent, is called as _____ signal.
15) Define noise in modern communication systems.

Questions for 4 marks

1) Draw the block diagram of modern communication system. Explain each block in brief.
2) What do you mean by modulation? Define AM, FM and PM.
3) Explain how it is possible to reduce antenna height and to avoid mixing of signals by using modulation process.
4) Explain how it is possible to increase range of communication and to avoid mixing of signals by using modulation process.
5) Explain how it is possible to multiplex the signals and to adjust the band width of signals by using modulation process.
6) Explain the concept of modulation process. Explain how quality of signal improved by using this process.

7) What is mean by communication process? Compare traditional trends of communication with modern trend of electronic communication.

8) If the modulation process not used then for the transmission of a signal of 20 KHz frequency, the length of transmitting antenna will be approximately $1/4^{th}$ of the wavelength of the wave. Estimate the height of receiving antenna.

9) Explain in brief the importance of transmitter and receiver in modern communication system.

10) Explain about communication channel and noise source in modern communication system.

11) Draw the block diagram of modern electronic communication system and explain transmitter section.

12) Draw the block diagram of modern electronic communication system and explain about communication channel.

13) Draw the block diagram of modern electronic communication system and explain about receiver section involved in it.

14) Draw the block diagram of modern electronic communication system. Explain how noise affects on the system performance.

15) Explain how antenna height reduces by employing modulation technique in modern communication systems.

16) Explain the following terms in one sentence each,
   i) Radio wave, ii) Modulating signal, iii) Carrier signal and iv) Noise

17) Explain in brief the need of modulation process in modern communication systems.

Questions for 6 marks

1) With the help of block diagram, explain modern communication system in detail.

2) In modern communication system, explain the following blocks,
   i) Transmitter
   ii) Receiver
   iii) Channel
   iv) Noise

3) Explain the need of modulation in response to antenna height, long distance communication, multiplexing of signals and improved signal quality.

4) Define modulation process. State its types. Explain the need of it in modern electronic communication systems.

Unit 2: Amplitude Modulation and Detection (12 Marks)

Questions for 2 marks
1. Draw only the circuit diagram of diode as AM detector.

2. The transmitted power in case of an AM wave depends on its modulation index, comment.
3. Write an equation showing mathematical analysis of an AM wave. Give the meaning of each term involved in it.
4. Draw only the diagram of frequency spectrum of an AM wave.
5. Define amplitude modulation. Give the formula for its modulation index.
6. What do you mean by SSB and DSB in an AM wave?
7. What is the function of RF crystal oscillator in an AM transmitter?
8. In an AM transmitter, the buffer amplifier is necessary in between RF crystal oscillator and class C power amplifier, comment.
9. Give only the salient features of class C power amplifier used in an AM transmitter.
10. What is AM detection? Which semiconductor device is used for this process?
11. What is the function of low pass filter used in an AM super heterodyne receiver?
12. Give the importance of mixer stage used in an AM superheterodyne receiver.
13. What is the importance of a local oscillator circuit in an AM superheterodyne receiver?
14. What is the function of AGC attached with the detector stage in an AM superheterodyne receiver?
15. State only the advantages of an AM superheterodyne radio receiver.
16. State the function of gang condenser used in AM receivers.

Questions for 4marks

1) Explain the following terms in connection with an AM wave:
   i)   Modulation index   and   ii) Band width
2) Represent an AM wave in the form of
   i) Frequency domain and and   ii) Time domain
3) From the relation of modulation index, $m = (E_m/ E_c)$ show that,
   $$m = (E_{max} - E_{min})/ (E_{max} + E_{min})$$
4) Show that in case of AM wave and for 100% modulation the power contained in the carrier signal is $(2/3)^{rd}$ of the total power.
5) In case of AM wave, estimate the theoretical equations of power contained in carrier wave (P_C), power contained in side band (P_{SB}) and total power (P_T) contained.
6) For an AM signal, obtain the expressions of power relations in carrier wave and side bands. Hence, obtain the relation for total power (P_T).
7) Define LSB and USB in an AM wave. Give their importance.
8) Define modulation index of an AM wave. Give its significance.
9) What do you mean by amplitude modulation? Give the drawbacks of the

AM process.
10) Write the features of IC- TDA1072A, an AM receiver.
11) Show that the total power in an AM wave is given by,
   $P_t = P_c [1 + m_a^2 / 2]$, where symbols have their usual meaning.
12) Draw only the block diagram of AM superheterodyne receiver showing proper waveforms at each stage.
13) Draw the circuit diagram of an AM detector and hence explain its working.
14) A carrier wave of 500 W is subject to 100% modulation. Determine the power in each side band and total power radiated.
15) In AM process, an audio signal of 1 KHz frequency modulates a carrier wave of 500 KHz frequency. Determine side band frequencies and bandwidth required.
16) Draw the circuit diagram of transistorized AM modulator and explain its working.
17) Explain the action of mixer stage in AM superheterodyne receiver.
18) Write a short note on 'automatic gain control (AGC)'.
19) An AM transmitter radiates total power of 20 KW. The carrier is modulated to the depth of 80%. Calculate power in carrier and power in each side band.
20) Calculate the power in carrier and in each side band if an AM transmitter radiates total power of 10 KW, if its modulation factor is 0.7.
21) State the superheterodyne principle. What are the advantages of an AM superheterodyne receiver?
22) What is mean by over modulation? Why it is not desirable in an AM process?
23) Draw the suitable diagrams to understand the concepts of under modulation, exact modulation and over modulation in case of AM waves.
24) Give the requirements on AM radio receiver for better quality reception of radio waves.
25) Explain the function of RF crystal oscillator in an AM transmitter.
26) Write a brief note on class C power amplifier used in an AM transmitter.
27) Explain the action of mixer stage in an AM superheterodyne receiver.
28) Explain how an intermediate frequency achieved in AM superheterodyne receiver.

Questions for 6 marks

1) An audio frequency signal, $10\sin (2\pi \times 500t)$ is used to amplitude modulate a carrier of $50\sin (2\pi \times 10^5 t)$. Calculate modulation index, side band frequency, amplitude of each side band frequency, bandwidth required and total power delivered to the load of 600Ω.
2) An output voltage of AM transmitter is given by,

400 $(1 + 0.4\sin 6280t)$ sin $(3.14 \times 10^7 t)$. This voltage fed to the load of 800Ω. Determine, i) Carrier frequency, ii) modulating frequency, iii) carrier power and iv) total power output.

3) State the superheterodyne principle. Draw the block diagram of AM superheterodyne receiver. Show proper waveforms at each stage. Explain its action.

4) Derive an expression for instantaneous voltage of sinusoidal amplitude modulated wave. Hence, obtain modulation factor for AM waves.

5) Define an amplitude modulation. State the formula of its modulation index. Explain with neat circuit diagram an AM modulator you have studied.

6) What is the application of IC- TDA 1072A in communication technology? Sate and explain its features in detail.

Unit 3: Frequency Modulation and Detection

Questions for 2 marks

1) Both FM and PM are the types of angle modulation, comment.
2) Define frequency modulation. Draw the pattern of FM wave.
3) Define modulation index for FM wave.
4) Write an equation of FM wave. State the meaning of each term involved in it.
5) In FM, modulation index can be greater than one where as in an AM it should be in between zero and one, comment.
6) Which factor decides the number of side bands in FM wave?
7) The FM system is less susceptible to noise than AM system, comment.
8) Give the classification of the types of FM generation.
9) Draw only the circuit diagram of FET reactance modulator for the generation of FM waves.
10) Draw the block diagram of directly modulated FM transmitter.
11) What is the limitation associated with directly modulated FM transmitter?
12) What is the importance of discriminator circuit in FM receiver?
13) What is the importance of de-emphasis network in FM receiver?
14) The FM wave consists of an infinite number of side bands, comment.
15) What is the magnitude of intermediate frequency in FM receivers?

Questions for 4 marks

1) Draw the block diagram of FM receiver. Explain only its IF stage.
2) Draw the block diagram of FM receiver. Explain only its discriminator stage.

3) Draw the block diagram of FM receiver. Give the importance of pre-emphasis and de-emphasis networks.
4) Draw the block diagram of frequency stabilized FM transmitter. Explain how frequency stability achieved in this type of transmitter.
5) Draw the circuit diagram of phase shift discriminator. Explain the principle involved in it for the detection of FM waves.
6) Enlist four advantages of FM system.
7) Draw a circuit diagram of FET reactance modulator for FM waves and give its principle.
8) State the important features of IC- T4258.
9) Distinguish between AM and FM processes.
10) A FM wave is represented by an equation,

$$e = 20\sin (8 \times 10^8 t + 5\sin 2500t).$$

Calculate the carrier frequency, modulating frequency and maximum 'δ'.
11) A FM wave is represented by an equation,

$$e = 10\sin (6 \times 10^8 t + 5\sin 5000t).$$

Calculate the carrier frequency, modulating frequency and maximum 'δ'.
12) Enlist the merits and demerits of AM and FM.
13) Define frequency modulation. Write the formula for its modulation index. Draw the pattern of FM signal.
14) State the merits and drawbacks of FM system.
15) Draw the block diagram of frequency stabilized FM transmitter and explain it in short.
16) Explain the action of mixer stage in frequency stabilized FM transmitter.
17) Give the working principle of FET reactance modulator.
18) Draw the block diagram of directly modulated FM transmitter and explain its working.
19) Draw the circuit diagram of Foster-Seeley discriminator for FM detection.
20) Draw the block diagram of FM receiver.
21) Write a short note on mixer stage used in FM receiver.

Questions for 6 marks

1) Explain in detail, the FET reactance modulator for generation of FM waves. Draw its necessary circuit diagram.
2) What is the application of IC- T4258 in communication technology? Sate and explain its features in detail.
3) Explain in detail, the phase shift discriminator for detection of FM waves. Draw necessary circuit diagram.
4) Draw the block diagram of FM receiver and explain the function of each block.

5) Give the mathematical analysis of FM waves. Explain frequency deviation and frequency modulation index.
6) Write an equation of FM wave. Explain the meaning of each term involved in it. From equation, draw the frequency spectrum for FM waves.
7) Draw the block diagram of frequency stabilized FM transmitter and explain its working in detail.

Unit4: Antenna & Wave propagation

Questions for 2 marks

1) Define directional gain of an antenna.
2) The larger the antenna, higher will be its directive gain, state true or false.
3) Non-resonant antenna has lower directive gain than resonant antenna, state true or false.
4) Define power gain of an antenna,
5) State the formula for obtaining power gain of an antenna.
6) Define field intensity of an antenna.
7) State the conditions by which field strength of an antenna affected.
8) Define antenna resistance.
9) What are the possible causes of antenna losses?
10) Write down an equation for calculating efficiency of an antenna.
11) State only the types of antenna you studied.
12) Define front to back ratio of an antenna.
13) Define propagation of radio waves.
14) State the different types of radio wave propagation.
15) Draw the schematic diagram showing different types of propagation.
16) State the main application of ground wave propagation.
17) Draw the schematic diagram, which shows different layers of atmosphere, useful for the propagation of radio waves.
18) Draw the schematic diagram, which shows different layers of ionosphere, useful for the propagation of radio waves.
19) What is the range of E layer of ionosphere from the Earth's surface?
20) Draw the diagram showing actual and virtual heights of an ionized layer.
21) What is the velocity of electromagnetic waves propagating through free space?
22) Draw the diagram showing transverse electromagnetic wave in free space.
23) Define critical frequency in case of sky wave propagation.
24) Define maximum usable frequency in case of sky wave propagation.
25) Define virtual height in case of sky wave propagation.
26) Define skip distance in case of sky wave propagation.

27) What is the limitation associated with radio waves in case of space wave propagation?
28) High frequency waves are,
    a) absorbed by F2 layer
    b) reflected by D layer
    c) capable of use for long distance communications on the moon.
    d) affected by the solar cycle
29) Frequencies in the UHF range normally propagate by means of
    a) ground waves
    b) sky waves
    c) surface waves
    d) space waves
30) The ground waves eventually disappears, as one moves away from the transmitter, because of
    a) interference from the sky wave
    b) loss of line of sight conditions
    c) maximum single hop distance limitation
    d) tilting
31) Electromagnetic waves are refracted when they
    a) pass into a medium of different dielectric constant
    b) are polarized at right angles to the direction of propagation
    c) encounter a perfectly conducting surface
    d) pass through a small slot in a conducting plane.
32) Diffraction of electromagnetic waves
    a) is caused by reflections from the ground
    b) arises only due to spherical wavefronts
    c) will occur when the waves pass through large slots
    d) may occur around the edges of a sharp obstacle.

Questions for 4 marks

1. An antenna has a power gain of 16. Calculate the directivity of this antenna.
2. An antenna has a radiation resistance of 72Ω and a antenna resistance of 8Ω. Calculate the efficiency of an antenna.
3. A half wave dipole antenna is capable of radiating 2KW of power and has a 2dB gain over an isotropic antenna. How much power delivered to the isotropic antenna?
4. What is antenna efficiency? Explain how it is estimated.
5. Explain the terms, effective aperture and effective length of an antenna.
6. Explain the terms, antenna gain and directive gain of an antenna.
7. What is antenna resistance? Explain its two types.
8. Write a short note on radiation pattern of an antenna.

9. Write a short note on polarization of radio waves.
10. Explain half wave dipole antenna.
11. State antenna parameters you studied. Define any two of them.
12. Calculate the directivity of an antenna if its power gain is 3dB.
13. Define field strength of an antenna. State the factors, which affect the field strength.
14. Explain the folded dipole antenna. State its applications.
15. In sky wave propagation, calculate the maximum usable frequency if critical frequency is 8MHz and angle of incidence is 60^0.
16. Determine the length of an antenna operating at a frequency of 500 KHz (Given: velocity factor = 0.95).
17. State types of propagation you studied. Explain ground wave propagation in brief.
18. State types of propagation you studied. Explain space wave propagation in brief.
19. State types of propagation you studied. Explain sky wave propagation in brief.
20. Give the comparative features of ground wave, space wave and sky wave propagation.
21. Describe the following terms connected with sky wave propagation:
    i) Virtual height,   ii) critical frequency,   iii) MUF   and   iv) skip distance
17. What is fading? Explain how it occurs in sky wave propagation.
18. What is fading? List its major causes.
19. What is skip distance? Explain how it is related with the maximum usable frequency.
20. Draw the diagram showing regular variations of the ionosphere.
21. Write a short note on space wave propagation.
22. Write a short note on ground wave propagation.
23. Explain the terms, antenna loss and antenna efficiency.
24. Determine the length of an antenna operating at a frequency of 500 KHz.
25. What do you mean by polarization in antenna?
26. Define antenna resistance. State its types.
27. What do you mean by effective aperture of an antenna? Write its formula.
28. Define radiation resistance of an antenna. What is its significance?
29. Explain the terms, bandwidth and beamwidth of an antenna.
30. What functions does an antenna fulfill?
31. Explain what is mean by the terms, isotropic source and isotropic medium.
32. What is refraction of radio waves? Under what circumstances does it occur?
33. What is interference of radio waves? Under what circumstances does it occur?

34. What is diffraction of radio waves? Under what circumstances does it occur?
35. Write secant law used in radio wave propagation. Explain its importance.
36. Explain the evolution of the basic dipole antenna.
37. Explain the meaning of dipole and half wave dipole.
38. Distinguish between sky wave and space wave propagation.
39. Give the features of direct wave, space wave and sky wave propagation.
40. Draw the diagram showing current and voltage distribution on a half wave dipole.
41. Draw the diagram showing Yagi antenna and its radiation pattern.
42. What is Yagi antenna? Give its applications.

Questions for 6 marks

1. What is resonant antenna? Explain in detail half wave dipole.
2. With the help of neat diagram, describe the Yagi antenna in detail.
3. State types of antenna you studied. Explain dish antenna in detail.
4. Explain the terms, bandwidth, beamwidth and polarization in connection with an antenna.
5. With the help of proper sketches, explain fully the operation of a Yagi-Uda array. List its applications.
6. With the help of proper sketches, explain fully the operation of a dish antenna. List its applications.
7. Describe the scenario of ionosphere and their effects on sky wave propagation. Why this propagation generally better at night than during the day?
8. What do you mean by ionosphere? Draw necessary diagram that shows different layers of it. Explain each layer in brief as far as its importance for the propagation of radio waves is concerned.
9. Explain following terms in connection with an antenna:
   i) Field strength,   ii) antenna impedance,   iii) directivity,
10. State the types of propagation you studied. Explain in brief space wave propagation.
11. State the types of propagation you studied. Explain in brief ground wave propagation.
12. Explain following terms in connection with an antenna:
    i) directional gain,   ii) radiation pattern   and iii) front to back ratio

Unit IV: Television System

Questions for 2 marks

1. Define scanning process used in TV receivers.
2. What do you mean by persistence of vision?
3. What do you mean by flickering of TV receiver screen?
4. Why flickering occurs at the screen of TV receivers?
5. State the magnitudes of vertical scanning and horizontal scanning frequencies.
6. Which modulation technique is used for transmission of sound in TV system?
7. Which modulation technique is used for transmission of picture in TV system?
8. According to the European standards_____MHz is the channel width used in TV systems.
9. According to the European standards_____MHz is the video bandwidth used in TV systems.
10. _____ is the number of lines per frame used in TV scanning according to the European standards.
11. _____ is the number of frame per second used in TV scanning according to the European standards.
12. The number of lines per frame used in TV scanning according to the European standards is,
    i) 525   ii) 625   iii) 25   iv) 50
13. The number of frames per second used in TV scanning according to the European standards is,
    i) 25   ii) 30   iii) 525   iv) 625
14. Interlacing is used in TV receivers to,
    i) produce illusion of motion
    ii) ensure all the lines on the screen are scanned
    iii) simplify the vertical synchronize pulse train
    iv) avoid flicker

Questions for 4 marks

1. Explain the principle of sound transmission used in TV transmitter system.
2. Explain the principle of picture transmission used in TV transmitter system.
3. Explain the principle of sound reception used in TV receiver system.
4. Explain the principle of picture reception used in TV receiver system.
5. What is mean by flickering of the TV screen? How it is minimized?
6. Explain the following terms in short:
   i) Scanning,   and   ii) Interlaced scanning.
7. Explain the following terms in short:
   i) Horizontal scanning   and   iii) Vertical scanning.

8. Explain the importance of blanking pulses in composite video signal.
9. Explain the importance of synchronizing pulses in composite video signal.
10. Write a short note on 'interlaced scanning.'
11. Draw the block diagram of basic TV transmitter system and explain its any one block.
12. Draw the block diagram of basic TV receiver system and explain its any one block.
13. Explain the basic principle used in colour television system.
14. A TV signal is much more complicated than a radio signal. Give reason.
15. Frequency modulation is not used for video signal broadcasting in TV systems, comment.
16. Explain the function of RF tuner used in colour TV receiver.
17. Explain the IF section of colour TV receiver.
18. Explain how sound signal separation is achieved in colour TV receivers.
19. Explain the chroma processing sub-system in colour TV receivers.
20. Write a note on automatic colour control (ACC).

Questions for 6 marks

1. Explain in detail, a composite video signal.
2. Define scanning. Explain in detail, an interlaced scanning.
3. Explain in detail the blanking pulses and synchronizing pulses used in composite video signal.
4. Explain the following terms in short:
   i) Persistence of vision,   ii) Flickering   and   iii) Scanning
5. Draw only the block diagram of complete TV transmission and reception system.
6. Draw the block diagram of colour TV receiver and explain the function of each block in brief.
7. Draw the block diagram of colour TV transmitter and explain the function of each block in brief.

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T.Y.B.Sc. Elctronics (Paper III)
ELE. 313 Microprocessor I

Unit I: The processor 8086

Questions for 2 marks

1. What are the length of the 8086's address bus and data bus and How large is the instruction queue of the 8086?
2. List the elements of the execution unit.
3. What is the purpose of a software model for a microprocessor?
4. How large is the 8086's memory addresses space and I/P addresses space.
5. How and which flag determines whether the address for a string operation is incremented or decremented.
6. A data segment is to be located from address A0000H to AFFFFH. What value must be loaded in to DS?
7. What are the purpose of status bits S_3 and S_4?
8. What information appears on the address/ data bus of the 8086 while ALE is active ?
9. Explain the operation of the $\overline{\text{LOCK}}$ pin.
10. What conditions do the QS_1 and QS_0 pin indicate about the 8086?
11. How many bytes are addressable by the 8086?
12. Name all the segment registers.
13. Name all the registers that are divided in to two bytes.
14. From which address the 8086 starts execution after RESET?
15. What is the function of SI and DI register?
16. What is the function of Queue?
17. What do you mean by index registers?
18. How much is the programmable I/O space of 8086?
19. What is the function of ALE pin available in 8086 CPU?
20. Draw the diagram of register organization for 8086
21. Identify the op-code and operand for the following 8086 instruction
     a) AND BX, CX. B) MOV AX, data.
22. How does a memory read bus cycle differ from an I/O read bus cycle?
23. List the rules for memory segmentation in 8086.
24. What is the function of an address?
25. What determines the address of the first instruction in memory?

Questions for 4 marks

1. Explain the function of ALE pin available on 8086 microprocessor.

2. Explain the memory segmentation in 8086.
3. Explain function of the following signals of 8086:
   a) $MN/\overline{MX}$.
   b) $M/\overline{IO}$.
4. Explain the function of data registers groups of 8086.
5. Explain the function of HLDA and HOLD pin.
6. Explain the 8086's PSW.
7. Explain function of the following signals of 8086:
   a) $\overline{RD}$
   b) $\overline{WR}$
   c) ALE
8. Explain the function of segment registers of 8086.
9. Explain the function of the $\overline{DEN}$ and $DT/\overline{R}$ signals of 8086.
10. Explain the function of the $\overline{INTA}$ and $\overline{LOCK}$ signals of 8086.
11. Explain function of the stack pointer of 8086.
12. State the format of the flag register of 8086 and explain the purpose of each bit.
13. Explain the de-multiplexing of the bus AD_0 to AD_{15} in 8086.
14. Draw and discus flag register of 8086.
15. Explain the concept of segmented memory in 8086? What are its advantages?
16. Explain the function of the RESET and READY signals of 8086.
17. Draw the block diagram of 8086.
18. What is function of ALU.
19. State the different segments of memory and what is the use of each segment in the 8086?
20. How the physical addresses is generated by 8086?
21. What do you mean by segment override prefix?
22. What is the function of instruction pointer register?
23. What is the difference between fetching a number from memory and reading a number from memory?
24. Why must the programmer know about the CPU in order to program in assembly language ?
25. Explain the difference between memory and I/O.
26. If the CS register contain the number B000H and IP contain the number ABCDH, what is the address of the instruction

Questions for 4 marks

1. State and explain in short the pin diagram of 8086.
2. Explain the function of program counter.

3. Explain the function of the following signals of 8086:
   a) $\overline{\text{TEST}}$
   b) $\overline{\text{BHE}}$
4. Explain the function of the following signals of 8086:
   a) $\overline{\text{RQ}}/\overline{\text{GT}}$
   b) READY
5. Explain the function of the following signals of 8086:
   a) INTER
   b) NMI
6. Explain the function of the following signals of 8086:
   a) $\overline{\text{RD}}$
   b) $\overline{\text{WR}}$
7. Explain the function of the following signals of 8086:
   a) HOLD
   b) HLDA
8. Explain the function of the following signals of 8086:
   a) $\overline{\text{INTA}}$
   b) $\text{MN}/\overline{\text{MX}}$
9. Explain the physical address formation in 8086.
10. Explain the register organization of 8086.
11. Explain the pointer and index register group.
12. Write short note on segment registers.
13. What are the advantages of using memory segmentation?
14. Write short note on memory segmentation.
15. Draw and explain in short the programmer's model for 8086.
16. Explain how 20 -bit physical addresses is obtained in 8086?
17. State and explain DMA signals of 8086 microprocessor.
18. Give the internal operation of 8086.
19. What is PSW? Explain 8086 flag register.
20. How will you calculate physical address of memory using effective address? Explain with suitable example.
21. What are the different types of buses? Explain the function of each type of bus.
22. Give the sum and flag setting for AF, SF, ZF, CF, OF, PF after adding 63A1H to 33A1H.
23. Explain the function of the BIU and EU.

Questions for 6 marks

1. Explain the architecture of 8086 with diagram.
2. Draw and explain programmer's model for 8086.

3. Draw and explain register organization of 8086.
4. Draw and explain in short pin diagram of 8086.
5. Draw the bit pattern for flag register of 8086 and Explain the significations of each bit with example.
6. Draw programmer's model for 8086 microprocessor labeling it nearly. How does 8086 convert a logical address in to a physical addressing? When does it update the instruction queue?
7. Draw and explain the functional block diagram of the 8086 microprocessor.
8. The content of 8086 registers are as given bellow. Find the physical address for following instructions
   D470H in DS,   2D91H in SS,   1002H in ES,
   2111H in CS,   0030H in BP,   0040H in SP,
   0050H in SI,   0060H in DI,
   a) MOV AL, [BP]
   b) MOV CX,[SP]
   c) MOV BL, [BP+SI]
9. Draw diagram and explain de-multiplexing of bus AD_0 toAD_{15} in 8086 with latch.
10. Enlist salient feature of 8086.
11. Describe the stack area of memory and How it is addressed.
13. Explain function of the BIU and the EU.

Unit II: 8086 instruction set

Questions for 2 marks

1. How does the microprocessor differentiate between data and instruction?
2. List all 8086 registers that can be accessed as byte or as words.
3. Which addressing mode would you use to initialize a CPU register with data?
4. What is the advantage of register indirect addressing mode versus the direct addressing mode?
5. Each of the following instruction is invalid
   a) MOV DS, 1234H   b) MOV CX, [AX]   Explain why.
6. Which logical instruction should be used to force bit 0, bit 1 of register DH low without changing any of the other bits?
7. Which logical instruction should be used to force bit 0, bit 1 of register DH high without changing any of the other bits?
8. Which 8086 general purpose registers cannot be used as base pointer Index registers in the indirect memory access addressing mode.

9. Using MOV instruction, which of the following data transfer is illegal?
   a) memory to memory   b) memory to register
   c) register to memory   d) segment register to memory.
10. List the 8-bit registers that are used for register addressing.
11. List the 16-bit registers that are used for register addressing.
12. What is wrong with the MOV BL, CX instruction?
13. Which base register addresses the data in the stack segment?
14. What is the difference between an inter segment and intra segment jump?
15. How many bytes are stored on the stack by PUSH instruction?
16. Is it possible to add CX to DS with the ADD instruction?

Questions for 4 marks

1. Explain the usefulness of the following instructions in 8086
      a) LOCK   b) LES
2. Write the difference between the following instructions
      MOV CX, 437AH and MOV CX, [437AH].
3. Give the different method s of addressing modes. Explain any one of
   them with a suitable example.
4. Show the result that will be in the affected register after the following
   groups of instructions executed.
      ADD AH, BL
      DAA
   Assume (AX) = 4253H   (BX) = 075AH
5. Define the term
      i) Stack   ii) Assembler   iii) Procedure
6. Explain the following instruction
      1) MOV DST, SRC.
      2) INC OPR.
      3) SAR OPR, CNT.
7. Explain the instructions
      i) NOT   ii) XOR   iii) NOP
8. Explain the need of addressing modes with suitable example for the
   following.
      i) Relative base indexed   ii) Register indirect
9. Explain the use of DAS instruction.
10. Explain the execution of RET instruction.
11. "Immediate addressing is faster than indexed addressing" comment.
12. What is the key difference between the un-conditional jump instruction
    and conditional jump instruction.
13. What function is performed by the RET instruction?

14. State and explain data related addressing mode of 8086 microprocessor.
15. State type of instructions of 8086.

Questions for 4 marks

1. Explain in short different addressing modes of 8086 microprocessor.
2. Explain the following instructions
   1)SSB, 2)STC, 3)ADD.
3. Explain the following instructions.
   1)XCHG 2)RCL.
4. Give the difference between NOP and HLT instructions.
5. Explain the CALL and RET instructions of 8086.
6. Explain the PUSH and POP instructions of 8086.
7. Explain the ADD and SUB instructions of 8086.
8. Explain the AND and NOT instructions of 8086.
9. Explain the use of DAA instructions of 8086.
10. With help of the an example describe the action performed by microprocessor 8086 for each of the following instructions.
    1)AAM   2)IMUL.
11. Explain control transfer (branch) addressing mode of 8086.
12. Distinguish between CALL and JMP instructions.
13. Explain execution of LOOP instruction with example.
14. What is the difference between following two instructions.
    MOV AX, TABLE_ADDR
    LEA AX, TABLE_ADDR
15. How will you enter the single step mode of 8086?
16. What is the difference between the respective shift and rotate instructions?
17. What is REP prefix? What is its use?
18. What is LOCK prefix? What is its use?
19. Explain the execution of LOOP instruction with example
20. Explain the difference between the SUB and CMP instructions.

Questions for 6 marks

1. State the difference types of shift instructions Explain any of them with a suitable example.
2. Explain the PUSH and POP instructions of stack with a suitable example.
3. With a suitable example explain the instructions.
   1) ROR   2) LDS   3) CMP.
4. With help of the an example describe the action performed by microprocessor 8086 for each of the following instructions.

1) ROL   2) CBW   3) IDIV.

5. For the following instruction compute the address of memory operand for 8086 microprocessor.
   a) MOV AX, [BX],   b) MOV AL, [BP+SI],   c) MON AL, [BX+SI]
   Assume:

   CS=0100H   DS=0200H   ES=0030H   SS=0400H
   BP=0010H   BX=0020H   SI=0030H   SP=0040H.

6. Describe the difference between a jump and call instructions. What does the processor do in executing it? Use 8086 instructions to explain.

7. Explain the operation is performed by the following instructions
   a) MOV [BX][DI]+4, AX   b)XLAT   C)XTHL.

8. Explain the use of following instructions of 8086.
   a) LOOP   b)RAR   C)DIV.

9. What are the difference instructions types of 8086?

10. Explain the following addressing modes.
    a) Direct addressing   b) Indirect addressing   c) Immediate addressing
    d) Base registers addressing   e) Index addressing.

11. Explain with example various addressing modes of 8086 microprocessor.

12. Which of the following are invalid assembler language instruction? State the error for each invalid instruction. Assume that all identifiers are variable and associated with words.
    a) MOV BP, AL   b) MOV CS, AX   C) MOV DS, BP
    d) MOV SAVE_WORD, DS   e) MOV AX, WORD_OP1[DX]
    f) MOV [BX][SI], 2.

13. Given that VAR1 and VAR2 are word variables and LAB is a label. Find the errors in the following instructions.
    a) ADD VAR1, VAR2   b) SUB AL, VAR1   c) JMP LAB[SI]
    d) JNZ VAR1   e) JMP NEAR LAB   f) AAA DX

14. What do you mean by addressing modes? What are the different? addressing modes supported by 8086? Explain each of them suitable example.

Unit III

Questions for 2 marks

1. What is the function of a directive?
2. What is the function of a label?
3. What is the function of a op-code?
4. What is the function of a operand?

5. What is the function of the data directive?
6. List the name of the directive.
7. Give another name for a directive.
8. Describe the difference between the EQU and = directive.
9. What is the function of an ORG directive?
10. What is the function of a end directive?
11. What is the function of a value- returning operator SEG?
12. What is the function of a value- returning operator OFFSET?
13. What is the function of a value- returning operator TYPE?
14. What is the function of a value- returning operator SIZE?
15. What is the function of a value- returning operator LENGTH?
16. What is the function of an attribute operator PTR?
17. What is the function of an attribute operator SHORT?
18. What is the function of an ASSUME directive?
19. What is the function of a COMMENT directive?
20. What is the function of a DB directive?
21. What is the function of a DD directive?
22. What is the function of a DW directive?
23. What is the function of an END directive?
24. What is the function of an EQU directive?
25. What is the function of an EVEN directive?
26. What is the function of an INCLUDE directive?
27. What is the function of a STRUC directive?
28. What is the function of a RECORD directive?

Questions for 4 marks

1. What does the statement
    SEG_ADDR DW 1234H
    do when processed by the assembler?
2. What happen when the statement
    BLOCK_1 DB 128 DUP(?)
    is processed by the assembler?
3. State the need of alignment directive.
4. What is the function of the following assembler directive?
    i) END   ii) ORG
5. What is the function of the following assembler directive?
    i) DB   ii) DW
6. What is the function of the following assembler directive?
    i) DD   ii) EQU
7. What is the function of the following assembler directive?

     i) ASSUME   ii) SEGMENT
8. What is the function of the following assembler directive?
     i) EVEN   ii) RECORD
9. What is the function of the following assembler directive?
     i) STRUC   ii) INCLUDE

Questions for 6 marks

1. Write a data directive statement to define INIT_COUNT as word size and assign it the value F000H.
2. Write short note on alignment directives.
3. Give the difference between an assembly language statement and a directive statement.
4. Describe any four assembler directives used in 8086 assembly language programming.
5. Explain the use of a
     i) DB
     ii) PTR
directives used in 8086 assembly language programming.
6. How will you use DUP operator to reserve 100 words in memory? Explain.
7. With suitable example, Explain segment definition directive.
8. Explain following assembler directive
     i) ASSUME   ii) END   iii) EVEN.
9. Write short note on value returning attribute operators directives.
10. What is a RECORD? Explain it with an example.

Unit VI

Questions for 2 marks

1. What is the function of the label?
2. What is the function of the op-code?
3. What is the function of the operand?
4. What is the purpose of the comment field?
5. How does an assembler process comment?
6. In the instruction statement SUB_A: MOV CL, 0FFH.
What is the source operand and destination operand?
7. When two 8-bit numbers are multiplied where the product found.
8. What is the function of assembly language instruction?
9. Which logical instruction should be used to force bits 0 and 1 of the register DH low without changing any of other bits?

10. Which logical instruction should be used to force bits 0 and 1 of the register DH high without changing any of other bits?

11. Determine the contents of register AL and the state of the flags after the following instruction are executed.

    MOV AL, 6DH
    MOV BH, 40H
    AND AL, BH

12. Write program, using the MOV instruction, to move the contents of register AX to registers BX, SI, and DS.

13. Write program, using the MOV instruction, to move the contents of register DL to registers AH, BH, and CL.

14. Write program, using the MOV instruction, to move the word contents of memory location DS:0FFC1H to register DI.

15. Write program, using the MOV instruction, to move the word contents of memory location DS:1234H to register DL.

16. Write program, using the MOV instruction, to move the contents of register BX to memory location DS:0A000H.

17. Write program, using the MOV instruction, to move the contents of register CL to memory location DS:4CA0H.

18. Write program, using the MOV instruction, to move the word contents of memory location DS:1234H to memory location DS:5678H.

Questions for 4 marks

1. The count in a move instruction that is to load CX is to be -10. Write the Instruction and express the immediate operand in binary from.

2. If A=8 and B=5, Find the value the assembler assigns to the source operand for the instruction

       MOV BH, (A*4-2) / (B-3)

3. What is the content of register BL after the following instruction are executed.

                MOV BL, 0B2H
                MOV CL, 2
                SAR BL, CL

4. You need to determine if bit 3 of register AH is high without changing the Contents of AH Which instruction should be used?

5. Determine the values of the 8086's six status flags after the following instruction are executed.

                MOV CL, 3
                MOV AX, 7FH
                MOV BX, 0505H

ROL AX, CL
AND AH, BH
OR BL, AL

6. Determine the content of register AL, BL and six status flags after the following instruction are executed.

        STC
        MOV AL, 4CH
        SBB AL, 3EH
        XOR BL, BL
        MOV [SI], BL

7. Determine the values of register SP after the following instruction are executed.

        MOV SP, 0FFFFH
        PUSHF
        PUSH CX
        CALL DELAY
        POP CX

8. Write programming sequence required to load the extra and data segment register with 80A0H.

Questions for 4 marks

9. Write programming sequence to add 1234H and 5678H. place the sum in DX.
10. Write programming sequence to add the byte in AL to the byte in AH and Put the result in BP.
11. Write program, using the MOV instruction, to move the contents of memory location DS:1ACDH to register ES.
12. Write program, using the MOV instruction, to interchange the byte contents of memory location DS:1234H with memory location DS:5678H.
13. Write program, using the MOV instruction, to interchange the contents of register DI and SI.
14. Write program, using the MOV instruction, to store the number 5678H in memory location DS:2000H using indirect addressing only.
15. Write program, using the MOV instruction, to store the contents of memory location DS:1234H in register BX using indirect addressing only .
16. Write program to make any word placed in AX equal to 0000H without using any MOV or AND instruction.

Questions for 4 marks

1. Enlist advantages of assembly language programming over machine

language.

2. What is the function of assembly language instruction?
3. What are the four elements of an assembly language statement?
4. Write a short sequence of instruction if DL=0FH & BH=72H list difference after BH subtract from DL and show the contents of the flag register.
5. Write a short sequence of instruction that subtract the number in DI, SI and BP from the AX register, Store the difference in register BX.
6. Determine the contents of register AX, BX and CX after the following program is run.

                MOV CL, 3
                MOV AX, 7FH
                MOV BX, 0505H
                ROL AX, CL
                AND AH, BH
                OR BL, AL

7. Determine the contents of register AL after the following instruction are executed.

                MOV AL, 3AH
                MOV CH, 0A9H
                ADD AL, 06H
                ADD AL, CH
                NEG AL
                DEC AL

8. Determine the contents of register AX after the following instruction are executed.

                MOV AX, 6242H
                MOV BL, 0FAH
                DIV BL

10. If AX=0805H and CL=09H, determine the final contents of register AX after the following two instructions are executed.

                AAD
                DIV CL

11. What single 8086 instruction is the equivalent of the following four instruction?

                PUSH BX
                PUSH AX
                POP BX
                POP AX

Questions for 6 marks

1. Write a program to add a data byte located at offset 0500H in 2000H segment to another data byte available at 0600H in the same segment and store the result at 0700H the same segment.
2. Write a program to move the contents of the memory location 0500H to register BX and also to CX. Add immediate byte 05H to the data residing in memory location, whose address is computed using DS=2000H and 0ffset =0600H. Store the result of addition in 0700H. Assume that the data is located in the segment specified by the data segment register DS which contain 2000H.
3. Write a program to add the contents of the memory location 2000H:0500H to contents of 3000H:0600H and store result in 5000H:0700H.
5. Write a program to move a byte string 16-byte long from the offset 0200H to 0300H in the same segment 7000H.
6. Write a program to move a byte string 16-byte long from the offset 0200H to 0300H in the same segment 7000H. Using loop instruction.
7. Write a program to move a byte string 16-byte long from the offset 0200H to 0300H in the same segment 7000H. Using MOVSW instruction.
8. Determine the contents of register AL after the following instructions are executed.
    1. MOV AL, 3AH
    2. MOV CH, 09AH
    3. ADD CH, 06H
    4. ADD AL, CH
    5. NEG AL
    6. DEC AL
9. Write a program using 8086 instructions for addition of two number 4236H and 1714H.
10. Write a program to find out the largest number from an unordered array of sixteen 8-bit numbers stored sequentially in the memory locations staring at offset 0500H in the segment 2000H.
11. Write a program to subtract the number in register DX from the number in register BX. If no borrow is generated, store the result in register CX. If borrow is generated, store the result in register AX.

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T.Y.B.Sc. Electronics (Paper IV)
ELE.314 Programming with C++

Unit: 1, 2, 3

Questions for 2 marks

1. What are the elements of object oriented program? (2)
2. Define - Algorithm and Flowchart
3. Define – Object and Class
4. Define – Encapsulation and Data Abstraction.
5. Define – Inheritance and Polymorphism.
6. Define – Reusability and Extensibility.
7. Define – Keywords and Identifiers.
8. Define – Actual and Formal arguments.
9. Define – Operator overloading and function overloading.
10. Define – Manipulators and constructors.
11. Explain insertion and abstraction operators.
12. Explain format of Function prototyping.
13. Explain concept of reference variable.
14. Give structure of c++ program (2)
15. What is scope resolution operator? How to represent it? (2)
16. Differentiate Object oriented and Object based Programming languages. (2)
17. What is meant by data hiding? (2)
18. Name at least two Oops languages other than c++.(2)
19. List out any two drawbacks of Procedure oriented languages. (2)
20. What is the variable in c++? How to form a variable? (2)
21. Write a Short note on I/O operators stream.
22. Explain type cast operator
23. Explain how to declare variable in c++.
24. What is inheritance?
25. What do you mean by const Arguments?

Questions for 4 marks

1. Write a brief note on – Objects and Classes.
2. Explain various types of expressions.
3. Write short note on inline functions.
4. Explain concept of default arguments.

5. Compare call by value and call by reference methods of passing the arguments.
6. Explain basic data types
7. Explain relational operators
8. Explain arithmetic operators
9. Explain logical operators
10. Explain if-else statement with example.
11. Explain while loop with example
12. Explain Advantages of Oop.
13. Merits & Demerits Of OOPS
14. Write about Switch Statement with example
15. Explain Do…While Statement
16. Explain data types in c++
17. Write a note on storage classes of variables.
18. Write a note on Implicit conversions.
19. Write differences between c and c++
20. Write a Short note on call by value
21. Write a Short note on call by Reference
22. Explain function overloading
23. Expalin inline function with example
24. Explain manipulators with examples
25. Write a program to check the given number is even or odd.
26. Write a program to print all odd numbers between 1 to 30.
27. Write a program to find factorial of a number.
28. write a program to demonstrate how to define and call function.

Questions for 6 marks

1. List at least six major differences between C and C++.
2. Explain in brief some important features of oops(6)
3. What is Object oriented Paradigm? Explain the various Features of oops(6)
4. List various control structures known to you and describe any two of them.
5. Write about functions in C++ in detail(6)
6. What is meant by function overloading? Give suitable example
7. Define classes, objects, polymorphism, inheritance, Encapsulation, data hiding.
8. Explain scope resolution operator with suitable example.
9. Explain any 2 control structure

10.   Write a short note on functions
11.   Explain different ways to pass arguments to functions
12.   Write short note on function prototyping
13.   Explain how to return values from functions
14.   Explain function overloading in detail with example
15.   Explain different types of storage classes.
16.   Write a program to check the number is prime or not?
17.   Write a program to print sum of all even and odd numbers between 1 to 50.
18.   Write a program to demonstrate function overloading.
19.   Write a program to find factorial of a number using function.
20.   Write a program to input any number and print its reverse.
21.   write a program to demonstrate use of inline function.
22.   Write a program to input any 4 digit number and print sum of its digits.

Unit 4: Objects & Classes

Questions for 2 marks

1. Give the general form of class declaration.

2. List different access specifiers used in class declaration.

3. State the different ways of defining member function.

4. What are members of class ?

5. State how to call member function ?

6. What are objects ? How they are created ?

7. State how the private member function is accessed ?

8. State the use of a constructor member function.

9. State the use of a destructor member function.

10. List which member functions are declared with the same name as that of the class name.

11. What is default constructor ?

12. When the constructor function is invoked ? what operations are carried out by the constructor ?

Questions for 4 marks

1. How does a C++ structure differ from a C++ class ?
2. What is a class ? How does it accomplish data hiding ?
3. What are objects ? How are they created ?
4. How is a member function of a class defined ?
5. When do we declare a member of a class static ?
6. What is a friend function ? Explain in brief.
7. State the merits & demerits of using friend function.
8. What are the difference between structures & classes in C ++ ?
9. What are objects ? Describe the syntax for defining an object with example.
10. What is a constructor ? Describe how it is invoked ?
11. List some of the properties of the constructor function.
12. Explain in brief parameterized constructor with suitable example.
13. What is a destructor ? Describe the syntax for defining the destructor function.
14. What are the differences between default & Parameterized constructor ?
15. What is copy constructor ? Explain its need ?

Questions for 6 marks

1. What is a class? Describe the syntax for defining a class with example.

2. What are constructor and destructor ? Explain how they differ from normal functions?

3. Define a class to represent a bank account with

Data members	Member functions
a. Name of depositor	a. To assign initial values
b. Account number	b. To deposit an amount
c. Type of account	c. To withdraw an amount
d. Balance amount	d. To display name & balance

4. Define a class distance with

Data members	Member functions
a. feets	a. To assign initial values
b. inches	b. To get distance values
	c. To add two distance objects
	d. To display distance

5. Define a class complex with

Data members	Member functions
a. real	a. To assign initial values
b. imag	b. parameterized constructor function
	c. To add tow complex numbers
	d. To display complex number

6. Define a class time with

Data members	Member functions
a. hours	a. To assign initial values
b. minutes	b. To get time
	c. To add two time objects
	d. To display time

Unit-5 : Operator overloading

Questions for 2 marks

1. What is polymorphism ?
2. State whether a constructor member function is overloaded.
3. Give the general syntax of operator function.
4. How many arguments are required in the definition of an overloaded binary operator ?
5. How many arguments are required in the definition of an overloaded unary operator ?
6. State the use of the operator overloading feature of C++.

Questions for 4 marks

1. What is an operator overloading? Explain in brief.
2. Explain in brief the importance of operator overloading.
3. What is an operator function? Describe the syntax of an operator function.
4. Explain the syntax of binary operator overloading. How many arguments are required in the definition of an overloaded binary operator?
5. Explain the syntax of unary operator overloading. How many arguments are required in the definition of an overloaded unary operator?
6. What is a friend function ? Give the syntax for overloading with friend function.
7. Explain operator overloading with friend function.

Questions for 6 marks

1. What is operator overloading? What is the necessity of the operator overloading?

2. What is the advantage of using friend function in operator overloading?

3. Write steps in the process of overloading operators.

4. What is operator overloading ? Explain importance of operator overloading.

5. What are the limitations of overloading unary increment / decrement operators ? How are they overcome ?

Unit 6: Inheritance

Questions for 2 marks

1. What is inheritance in C++?
2. What are different forms of inheritance ?
3. What are the base & derived class ?
4. What is visibility mode ?
5. List different visibility modes supported by C++.
6. State which feature of C++ is used to derive a new class from an old class ?

Questions for 4 marks

1. What is derived class ? Give syntax for defining derived class.
2. Describe the syntax of the single inheritance in C++.
3. Explain the base & derived classes in C++.
4. Explain the syntax for declaring the derived class.
5. Can base class, access members of a derived class ? Give reason.
6. What is visibility mode ? What are the different inheritance visibility modes supported by C++ ?

Questions for 6 marks

1. What are the differences between the access specifiers private & protected ?
2. What is inheritance ? Explain the need of inheritance with suitable example.
3. What is a class hierarchy ? Explain how hierarchies helps in building class hierarchies ?
4. What are the differences between inheriting a class with public & private visibility mode ?

Unit: 7 and 8

Question for 2 marks

1) Explain the new operation.
2) Explain the delete operation.
3) What do you mean by virtual function?
4) What is pure virtual function?
5) What is the role of new operator?
6) What is the role of delete operator?
7) How will you allocate sufficient right amount of memory?
8) What is friend function?
9) How will you create array of pointer to object?
10)   How I can access member of class using ptr?
11)   How I can create array of ptr to Object?
12)   What is pure virtual function?

Question for 4 marks
1) Explain **new** and **delete** operator.
2) What is the need of **new and delete.**
3) Explain ptr to object.
4) What is the need of ptr to object?
5) Explain the roll of **this** ptr.
6) What is **this** ptr?
7) Explain virtual function.

8) How you can access derived class member function using base pointer?
9) Why we need virtual function?
10)   What is difference bet static polymorphism and dynamic polymorphism?
11)   Explain friend function?
12)   What is the difference between friend function and normal function?
13)   What is the need of friend function?
14)   How non member function can also access private data of class?
15)   Explain static function.
16)   Explain copy constructor.
17)   Explain the term Stream.
18)   Explain the term Command and line argument.
19)   Explain the over loaded operators.<< and >>.
20)   Explain the string I/O getline c) and write line c)
21)   Explain the character I/O get c) and put c).
22)   Explain the functions in manipulation of file pointer
   i)   seek g c), ii) seek pc) iii) tell g c) iv) tell p c)

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T.Y.B.Sc. Electronics (Paper V)
ELE.315 Microcontroller

Unit I: Introduction to microcontroller 8051

Questions for 2 marks

1) 8051 microcontroller is -----bit microcontroller.
2) 8051 microcontroller has -----flags.
3) 8051 DIP package having -------pins
4) In 8051 microcontroller -------I/O lines are available.
5)) 8051 microcontroller consists of -----byte of RAM & ---bytes of ROM.
6) DPTR has ------bits.
7) List the basic units of microcontroller .
8) 8051 microcontroller has ------ I/O ports.
9)) 8051 microcontroller internal Ram has ------register banks.
10) In 8051 microcontroller which registers are used for register indirect addressing.
11) State the internal RAM memory allocation in 8051 microcontroller.

Question for 4 Marks

1) Draw the Block diagram of microcomputer & explain it in brief.
2) Draw the Block diagram of microcontroller & explain it in brief.
3) Write short note on microcontroller survey related to 4 bit & 8bit microcontroller.
4) State & explain the basic units of microcontroller system.
5) Compare the microprocessor with microcontroller .
6) Comment, Microcontroller is truly microcomputer system.
7) State different applications of microcontroller.

UNIT 2: Architecture of 8051 Microcontroller

1) State the Features of 8051 microcontrollers
2) Draw the block diagram of 8051 microcontroller.
3) Write short note on flag register.
4) Write short note on Timer /Counter.
5) Explain serial I/O controller in 8051 microcontroller.
6) Write short note on internal memory organization of 8051 μc.
7) Explain ,how will you connect external memory to 8051 μc.
8) Write short note on interrupt using 8051 μc.
9) Explain Oscillator & Clock in 8051 μc.
10) Explain pin configuration of 8051 μc.
11) Enlist & explain in brief the cpu registers in 8051 μc.
12) Write short note on Stack.
13) State the format of Timer control register TCON.
14) Write short note on serial I/O.
15) List the special function registers in 8051 μc.
16) Write the format for SCON special function register.

UNIT 3: Addressing modes & instructions

Questions for 4 marks

1) State & explain Addressing modes of 8051 µc.
2) Explain the following instructions
       i) XRL   ii) RRC   iii) CPL   iv) ORL   v) SWAP   vi) SUBB
3) Explain   JMP & CALL instructions.
4) List the Assembler directives & Explain each in brief.
5) Write short note on process status word .
6) State the instructions used for accessing the external memory .
7) classify the instructions according to their function.

UNIT 4: 8051 Microcontroller programming

Question for 4 marks

1) Write a program to convert decimal number in to hexadecimal number
2) Write short note on assembler.
3) Explain in brief the instruction syntax .
4) Explain the function of the followings in brief
         i) Editor   ii) Assembler iii) linker

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T. Y. B. Sc. Electronics (Paper VI)
ELE 316: Consumer Electronics

Unit 1: Thermoelectrical & Optoelectrical transducer

Questions for 2 marks

1. Define Transducer.
2. State the types of transducer.
3. What is photovoltaic effect?
4. What is Optocoupler?
5. List the different emitters/detectors known to you.
6. Thermistor as Thermoelectrical transducer. Comment.
7. State the different types of optical emitters known to you.
8. State the different types of optical sensors known to you.

Questions for 4 marks

1. Explain thermistor as Thermoelectrical transducer.
2. Explain the construction & working of thermistor.
3. Explain the working of solar cell.
4. Explain the working of photocell.
5. Write a note on Optocoupler.

Questions for 6 marks

1. What is photovoltaic effect? Explain the working of solar cell.
2. Write a note on thermistor.
3. What do you mean by Optocoupler? Explain it in brief.
4. Describe the construction & working of thermoelectric transducer you have studied. State its application.

Unit 2: Microphone, Loudspeaker & Music systems

Questions for 2 marks

1. Define microphone.
2. State the types of microphone.
3. State the characteristics of microphone.

4. Define directivity/sensitivity/signal to noise ratio/frequency response of microphone.
5. State the principle of electret microphone.
6. State the principle of carbon microphone.
7. List the characteristics of electret microphone.
8. List the characteristics of carbon microphone.
9. What do you mean by woofer
10. What is tweeter?
11. What is Squawker?
12. Microphone used in telephones is …………microphone .(Ribbon, Crystal, eletret, Carbon)
13. Horn type loudspeaker is called indirect radiating type loudspeaker. Comment.

Questions for 4 marks

1. State the characteristics of microphone. Explain any none of them.
2. Explain the working of electret microphone.
3. Explain the working of carbon microphone.
4. Write a note on Horn type loudspeaker.
5. Draw block diagram of CD player.
6. Explain the optical assembly in CD player.

Questions for 6 marks

1. Explain principle, construction & working of electret microphone.
2. Explain working of electrete microphone. State its any four characteristics.
3. Explain principle, construction & working of carbon microphone.
4. Explain working of carbon microphone. State its any four characteristics.
5. What do you understand by woofer, squawker & tweeter.
6. Draw block diagram of CD player. Explain the function of any one block.
7. Explain the following terms with reference to microphone i)Directivity ii)S/N ratio iii)Frequency response.

Unit 3: PA System

Questions for 2 marks

1. What is need of PA system?
2. What is PA system?
3. State the uses of PA system.
4. What do you mean by installation of PA system?

Questions for 4 marks

1. Draw the block diagram of PA system.
2. Sketch/Draw the PA system installation plan for public meeting in public park.
3. Sketch/Draw the PA system installation plan for auditorium having large capacity.
4. Write a note on Mixer stage in PA system.
5. How will you connect 4 loudspeakers of 4Ω each & 2 loudspeakers of 8Ω each to an amplifier having an output impedance of 2Ω.
6. Output impedance of an amplifier is 8Ω. Connect 4 loudspeakers of 4Ω each & 2 loudspeakers of 18Ω each such that the net impedance of the loudspeakers is matched with that of the amplifier.

Questions for 6 marks

1. Draw the block diagram of PA system. Explain the function of any one block.
2. Draw the block diagram of PA system. Explain the function of mixer.
3. Describe the PA system installation plan for public meeting in public park.
4. Describe the PA system installation plan for auditorium having large capacity.

Unit 4: Telephone system

Questions for 2 marks

1. What is DTMF?
2. What is telephone?
3. What do you mean by telephone exchange?
4. Explain the term: Telex
5. Explain the term: Modem
6. Explain the term: making connection with reference to telephone system.
7. Explain the term: answering call with reference to telephone system.

8. Explain the term: ending call with reference to telephone system.
9. State the signals used by telephone instrument & its exchange to communicate with each other.
10. State frequency & duration of dial tone signal.
11. State frequency & duration of dial back signal.
12. State frequency & duration of engage signal.
13. What are the different devices one can connect to phone line?

Questions for 4 marks

1. Explain the working of telephone set.
2. What is DTMF? Explain it.
3. Explain pulse dialing.
4. Explain dial tone & dial back signal.
5. Explain dial back signal & engage signals.
6. Explain the terms PBX & PABX.
7. Explain the transmitter used in telephone set.
8. Explain the receiver used in telephone set.

Questions for 6 marks

1. Describe the signals used by telephone instrument & its exchange to communicate with each other.
2. List the different devices one can connect to phone line. Explain any two of them.
3. Explain the following terms: i)Telex ii)Modem iii)PBX & PABX.

Unit 5: Modern home appliances

Questions for 2 marks

1. Explain the operating principle of microwave oven.
2. State the features of microwave oven.
3. Explain the operating principle of washing machine.
4. State the features of washing machine
5. Explain the operating principle of cellular phone.
6. State the features of cellular phone.
7. Explain the operating principle of electronic weighing machine
8. State the features/specifications of electronic weighing machine.

9. Draw the block diagram of microwave oven/ washing machine/ electronic weighing machine/cellular phone.

Questions for 4 marks

1. Draw the block diagram of microwave oven. Explain the function of any one block.
2. Draw the block diagram of washing machine. Explain the function of any one block .
3. Draw the block diagram of cellular phone. Explain the function of any one block
4. Draw the block diagram of electronic weighing machine. Explain the function of any one block
5. Explain the fuzzy logic used in washing machine.
6. With block diagram explain the fuzzy controller used in washing machine.
7. Explain the concept of cell in cellular phone.

Questions for 6 marks

1. Draw the block diagram of microwave oven. Explain it.
2. Draw the block diagram of washing machine. Explain it .
3. Draw the block diagram of cellular phone. Explain it
4. Draw the block diagram of electronic weighing machine. Explain it.

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