

(Pages : 3)

V – 2028

Reg. No. :

Name :

Sixth Semester B.Sc. Degree Examination, April 2025
Career Related First Degree Programme under CBCSS

Physics and Computer Applications

PC 1671 — COMPUTER NETWORKS AND SECURITY

(2021 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in one or two sentences.

1. Write any two characteristics of firewall.
2. What is a repeater?
3. UDP stands for.
4. Define the term cryptanalysis.
5. What is broadcasting?
6. Define digital signature.
7. What is baud rate?
8. Write the use of message digest.

P.T.O.



9. What is meant by parity bit?
10. WDM is the short name of _____.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** questions, not exceeding a paragraph of **50** words.

11. Define law of convergence.
12. What is an IP address?
13. Explain any four virus types.
14. What is mono alphabetic cipher?
15. Explain connection oriented and connectionless service.
16. What is TCP?
17. Define the term Steganography.
18. Differentiate LAN and WAN.
19. What is cyber security attack?
20. Explain SMTP.
21. Explain Indian copyright act.
22. What is 1G and 2G in communication?

(8 × 2 = 16 Marks)



PART – C

Answer **any six** questions, in a page of **100** words.

23. Describe network security model.
24. What is PGP? Explain.
25. Write a detailed note on Guided transmission media.
26. Differentiate pure and slotted Aloha in detail.
27. Explain Dijkstra's algorithm for shortest path with an example.
28. Describe various transmission modes in detail.
29. Explain flow control in data transfer.
30. Discuss the term play fair cipher.
31. Explain network topologies.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions, not exceeding **4** pages.

32. Explain TCP/IP network in detail.
33. Discuss IP security in detail.
34. Write a detailed note on public key cryptography with a example algorithm.
35. Describe error detection and correction in computer networks.

(2 × 15 = 30 Marks)



(Pages : 3)

V – 2020

Reg. No. :

Name :

**Sixth Semester B.Sc. Degree Examination, April 2025
Career Related First Degree Programme under CBCSS**

Physics and Computer Applications

Elective Course

PC 1661.1 : ASTRONOMY AND ASTROPHYSICS

(2013 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences. Each question carries **1** mark.

1. Name the four fundamental forces in nature.
2. What is zodiac?
3. What are the two processes that produce energy by hydrogen fusion in sun?
4. What is a singularity?
5. What is the approximate age of solar system?
6. What is Hubble time?
7. Define luminosity of a star.
8. Sky of planet Venus is red in colour. Why?

P.T.O.



9. What is the period of revolution of Moon?
10. What does the redshift in the light emitted by a distant galaxy indicate?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions, not exceeding a paragraph. Each question carries **2** marks.

11. What is spherical aberration in lenses? How can it be corrected?
12. Write a short note on microwave background radiation.
13. What is Olbers paradox?
14. Differentiate between tropical year and sidereal year.
15. What are sun spots? Why do they appear dark in colour?
16. Give the classification of stars based on their temperature.
17. State and explain Stefan – Boltzmann law.
18. Differentiate between Asteroids and Meteorites.
19. How did Egyptians recognize beginning of a year?
20. How does the Hubble constant (H_0) vary with time for an open universe and a closed universe?
21. What is dark matter?
22. A solar day is longer than a sidereal day. Why?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. Each question carries **4** marks.

23. Briefly explain the formation of a star.
24. Write a short note on Hertzsprung – Russel diagram.



25. State and explain Kepler's laws of planetary motion.
26. Explain different types of galaxies.
27. Write a short note on comets.
28. Discuss different celestial coordinate systems.
29. How does the Chromosphere of sun get its red colour? Explain.
30. How does 'auroras' are formed at the polar regions of earth?
31. Discuss the occurrence of seasons on earth on the basis of the inclination of earth's rotational axis from the normal to the orbital plane.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

32. Explain the evolution of a star after it settles on the main sequence of the Hertzsprung-Sussel (H-R) diagram.
33. Discuss the formation of planets in the solar system.
34. Based on the Big-Bang model, explain the origin of the universe.
35. Discuss in detail, the features of different layers of the sun.

(2 × 15 = 30 Marks)



(Pages : 3)

V – 2026

Reg. No. :

Name :

Sixth Semester B.Sc. Degree Examination, April 2025
Career Related First Degree Programme under CBCSS
Physics and Computer Application
PC 1672 – OPERATING SYSTEM
(2021 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences.

1. What is FCB?
2. Define context switch.
3. What do you mean by hit ratio?
4. Define job queue.
5. What is a frames?
6. Define process.
7. What is turnaround time?
8. Define rotational delay.

P.T.O.



9. Differentiate between counting Semaphore and binary Semaphore.
10. What is a thread?

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** questions not exceeding a paragraph of **50** words.

11. What is a bad block?
12. How do you calculate effective access time in paging scheme?
13. What is process scheduling?
14. Write the advantage of worst-fit in memory management.
15. Define boot control block?
16. What are file attributes?
17. Explain inter process communication.
18. What is internal fragmentation?
19. Write note on system call.
20. Differentiate between logical and physical address space.
21. What is safe state?
22. What are the necessary conditions for dead lock?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions, in a page of **100** words.

23. Explain symmetric multiprocessing.
24. Describe FCFS process scheduling algorithm with an example.



25. Discuss various file access methods.
26. Write a note on process States.
27. Elaborate scan scheduling algorithm with an example.
28. Explain the most common techniques for structuring the page table.
29. Write note on resource allocation graph.
30. How does demand paging handle page faults?
31. Write note on segmentation.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions, not exceeding **four** pages.

32. Discuss RAID in detail.
33. Describe page replacement algorithms in detail.
34. Explain the evolution of operating system.
35. What is deadlock? Explain different methods to avoid and recover deadlock.

(2 × 15 = 30 Marks)



(Pages : 4)

V – 2023

Reg. No. :

Name :

Sixth Semester B.Sc. Degree Examination, April 2025

Career Related First Degree Programme under CBCSS

Physics and Computer Application

Core Course

PC 1642 : STATISTICAL MECHANICS AND QUANTUM MECHANICS

(2015 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions, each carries 1 mark.

1. What is a phase space?
2. Write two examples of fermions.
3. Define ensemble.
4. What is Compton effect?
5. State uncertainty principle.
6. Give the relation connecting entropy and probability.
7. Write the time dependent Schrodinger equation of a particle in one dimension.

P.T.O.



8. State equal apriori probability postulate.
9. What is meant by delta function potential.
10. State correspondence principle.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight**, each carries **2** marks.

11. What are Bohr's postulates?
12. Distinguish between microstate and macrostate.
13. Explain Bose-Einstein condensation.
14. Write the features of Rutherford planetary model.
15. Outline the probability interpretation of wave function
16. Explain bosons with examples.
17. Distinguish between group velocity and phase velocity.
18. Prove the non existence of the electron in the nucleus on the basis of uncertainty principle.
19. Define photoelectric work function and give the expression for it.
20. Explain stationary states.
21. Draw diagrams to represent canonical and microcanonical ensembles.
22. Write the Planck radiation formula and explain the symbols.

(8 × 2 = 16 Marks)



SECTION – C

Answer any **six** questions, each carries **4** marks.

23. Calculate the de-Broglie wavelength of electron accelerated through a potential of 150V.
24. If the uncertainty in the position of an electron is 4×10^{-10} m, calculate the uncertainty in its momentum.
25. The photoelectric threshold of tungsten is 2300 Å. Determine the energy in electron volt of the electrons ejected from the surface by ultraviolet light of wavelength 1800 Å.
26. Derive the time independent Schrodinger equation from the time dependent Schrodinger equation.
27. Calculate the Fermi velocity of an electron if its Fermi energy is 3.2 eV. Mass of an electron is 9.1×10^{-31} kg.
28. Find the rms speed of oxygen molecules at 0°C.
29. Determine the energy of the neutron in eV whose de Broglie wavelength is 1 Å. Mass of neutron is 1.674×10^{-27} kg.
30. Distinguish between Boson wave function and Fermion wave function.
31. A particle is moving in a one dimensional box of width 10 Å. Calculate the probability of finding the particle within an interval of 1 Å at the centre of the box, when it is in least energy state.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

32. Compare Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics.
33. Derive an expression for Maxwell-Boltzmann distribution function.



34. Obtain the wavefunction and energy of a particle in a finite potential well.
35. What is Compton effect? Explain its significance. Derive the expression for Compton effect.

(2 × 15 = 30 Marks)



(Pages : 4)

V – 2021

Reg. No. :

Name :

Sixth Semester B.Sc. Degree Examination, April 2025
Career Related First Degree Programme under CBCSS
Physics and Computer Application
Core Course
PC 1641 : SOLID STATE PHYSICS
(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries 1 mark.

- 1 Distinguish Bravais and Non Bravais lattices.
- 2 What do you mean by miller indices.
- 3 What do you mean by an inversion center.
- 4 Briefly explain reciprocal lattice.
- 5 Define Fermi surface.
- 6 Write the expression for the heat capacity of conduction electrons.
- 7 State Bloch theorem
- 8 Write a short note on ferroelectricity.

P.T.O.



9. State Meissner effect.
10. Write the type of classification of magnetic material.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. Each question carries **2** marks.

11. Write seven crystal systems based on lattice, vertices and angles.
12. Derive the expression for the relation between miller indices and interplaner spacing of cubic lattice.
13. Define ionic bonding and any two properties of ionic bonding.
14. State the basic assumptions of free electron model.
15. Define Hall effect and write the expression for Hall coefficient.
16. Briefly explain energy bands in solids.
17. What are the conclusions of Langevin Theory of diamagnetism.
18. Define ferromagnetism.
19. Distinguish type I and type II superconductors.
20. Briefly explain coherent length in super conductors.
21. Explain the classical theory of lattice specific heat.
22. State diffraction condition and Braggs Law.

(8 × 2 = 16 Marks)



SECTION – C

Answer any **six** questions. Each question carries **4** marks.

23. Show that five fold rotation axis is not compatible with a crystal lattice.
24. Calculate the interplanar spacing for a (1 1 1) plane in a lattice with $\alpha = \beta = \gamma = 90$ and $a=b=0.25$ nm and $c=0.18$ nm. Also name the crystal system.
25. Derive the relation between lattice vectors and reciprocal lattice vectors.
26. Briefly explain neutron diffraction. What is its application?
27. In copper there is only one free electron per atom. Calculate the fermi energy of electrons in copper.
28. Compare any four properties of dia, para and ferromagnetic materials.
29. Derive Einsteins law of specific heat.
30. Derive Clausis Mossotti equation.
31. Lead in the super conducting state has a critical temperature of 6.2K at zero magnetic field its critical field is 640 A/cm at OK. Determine the critical field at 4K.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. Each question carries **15** marks.

32. What do you meant by paramagnetism and derive Lagevin's theory of paramagnetism.
33. Describe different types of crystal bonding with properties and examples.



34. Explain

(a) Free electron model of electrical conductivity in metal

(b) the variation of electrical resistivity with temperature in metals.

35. Explain Debye model of lattice specific heat.

(2 × 15 = 30 Marks)

