E 2489 (Pages : 3) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2015

First Semester

Vocational Course—COMPUTER FUNDAMENTALS

(For Model II—B.Sc. Mathematics)

[2013 Admission onwards]

Time : Three Hours Maximum : 80 Marks

Part A (Very Short Answer Questions)

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

1. Why computer is called a data processor ?
2. Why binary numbers are used in computers ?
3. What is weighted code ? Give an example.
4. What are the advantages of primary memory compared to the secondary memories ?
5. Name any *four* different types of secondary memory.
6. "Hardware is normally a one-time expense whereas software is a continuing expense". Explain.
7. What is education software ? Give *three* examples.
8. What do you understand by modulation and demodulation ?
9. What is meant by a communication protocol ?
10. What is internet ? How did it evolve ?

(10 × 1 = 10)

Part B (Brief Answer Questions)

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

11. Describe the key features of fourth generation computers.
12. What is a "bit" in computer terminology ? How many different patterns of bits are possible with (a) 6-bits ; (b) 7-bits ; (c) 8-bits ?
13. What is a Gray code ? Why is it important ?
14. State the differences among RAM, ROM, PROM and EPROM.

Turn over

15. How does a static RAM cell differ from a dynamic RAM cell ?
16. What is a hard disk ? Name three different types. Write one usage each.
17. List the advantages and limitations of magnetic disks as a secondary storage device.
18. Differentiate between low level formatting and OS level file system formatting.
19. What is an assembly language ? What are its merits and demerits over machine language ?
20. What type of errors in a program a compiler can detect ? What type of errors in a program a compiler cannot detect ?
21. What is a wire pair ? In what situations they are suitable for use in data transmission ?
22. What is a hybrid network ? Why they are used ?

$(8 \times 2 = 16)$

Part C (Descriptive/Short Essays)

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

23. Perform the following conversions :
    (i) 101010111_2 to Gray code and BCD.
    (ii) 1100.0011_2 to octal and decimal.
24. (a) Add the decimal numbers – 48 and + 31 using 2's complement method.
    (b) Subtract the decimal numbers + 96 – (+ 69) using 2's complement method.
25. Explain how the multiplication and division operations are performed in a computer by using additive approach.
26. With neat diagrams, explain the operational details of processor and its interconnection with the memory unit.
27. Explain the printing mechanism of a dot matrix printer. Compare its performance with laser printer.
28. Explain the differences among assembler, compiler, interpreters and linker.
29. What is a network interface card ? Explain its use in a computer system.
30. What is modem ? What purpose do they serve in computer communication system ?
31. What is WWW ? Explain WWW browser ?

$(6 \times 4 = 24)$

Part D (Long Essays)

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

32. Discuss the different software technologies used in the five different generations of computers ? Explain their important features.

33. Explain the working of the keyboard, mouse and monitor used as the I/O devices of a computer.

34. Discuss any *three* different application packages used in present-day computers ?

35. Explain some basis services provided by the internet. Discuss how each of these services are useful to the users ?

(2 × 15 = 30)

E 2439 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2015

First Semester

Complementary Course—Physics

PROPERTIES OF MATTER, MECHANICS AND PARTICLE PHYSICS

(For the Subjects Chemistry and Geology)

[2013 Admission onwards]

Time : Three Hours Maximum : 60 Marks

Candidates can use Clark's tables and scientific non-programmable calculators.

Part A (Very Short Answer Questions)

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

1. Define Yield point and Breaking stress.
2. Diamond is said to be a hard material. What does it mean in terms of its modulus of elasticity.
3. Give a practical application of non-uniform bending.
4. Which terms in the moment of inertia tensor vanish when principal axes are referred ?
5. Define SHM and give one example.
6. Why rails are made in the form of I section ?
7. Two circular discs have their masses in the ratio 1 : 2 and their diameters in the ratio 2 : 1. What is the ratio of their moment of inertia ?
8. Distinguish between Bosons and Mesons.

(8 × 1 = 8)

Part B (Brief Answer Questions)

Answer any **six** *questions.*
Each carries 2 *marks.*

9. Define and distinguish between angle of shear and angle of twist.
10. Explain elastic fatigue ? Differentiate it from elastic limit.
11. Distinguish between free and forced vibrations.
12. State and explain parallel axis theorem.
13. Define momont of inertia ? What is its physical significance ?
14. Explain, why a loaded bus is more comfortable than an empty bus ?
15. Give two physical examples of resonance.

Turn over

16. Define : (i) amplitude ; (ii) frequency ; (iii) time period ; and (iv) phase of a body executing SHM.
17. What is meant by gauge particles ? Explain.
18. Why does a cyclist lean when negotiating a turn ?

(6 × 2 = 12)

Part C (Problems/Deviations/Short Essays)

Answer any **four** *questions.*
Each carries 4 *marks.*

19. A rubber cord of a catapult has a cross-sectional area of 2 mm^2 and an initial length of 0.2 m and is stretched to 0.25 m to fire a small object of mass 15g. If the Young's modulus is $Y = 6 \times 10^8 N/m^2$, what is the initial velocity of the object that is released ?
20. A wire of diameter 0.36 mm elongates by 1.2 mm when stretched by a force of 0.32 kg. wt. It twists through one radian when equal and opposite torques of 1.6×10^{-5} N/m are applied at its ends. Find the Poisson's ratio of the material of the wire.
21. A bicycle wheel has a radius of 30 cm and mass 2 kg and the bicycle is moving at 6 m/s :
    (a) Calculate the angular velocity of the wheel.
    (b) Find the angular momentum of the wheel under the assumption that the mass of the wheel is entirely at its edge.
22. A flywheel of radius of gyration 2 m and mass 8 kg rotates at an angular speed of 4 radians/sec about an axis perpendicular to it through its centre. Find the kinetic energy of rotation.
23. The velocity of the particle executing SHM is 1 m/s and 0.7 m/s when its distance from its mean position is 30 cm and 60 cm respectively. Find its time period and amplitude.
24. A mass of 100 kg is supported on a spring of stiffness constant 980 N/m. Find its compression and time period of vibration.

(4 × 4 = 16)

Part D (Essay/Problems)

Answer any **two** *questions.*
Each question carries 12 *marks.*

25. Describe torsion pendulum. Explain how it can be used to measure the moment of inertia of an irregular body and torsional rigidity ?
26. Derive the moment of inertia of a thin uniform rod about an axis perpendicular to its length and passing through : (i) its centre of mass, and (ii) one end.
27. What do you mean by simple harmonic oscillator ? Derive the equation of motion for SHM. Find the expression for angular frequency and energy of a simple harmonic oscillator ?
28. Differentiate between angle of twist and angle of shear. Derive an expression for the couple per unit twist of a uniform solid cylinder.

(2 × 12 = 24)