Fifth Semester B.Sc. Degree Examination, October/November 2019

(CBCS Scheme)

Electronics

Paper V : 8051 – MICROCONTROLLER AND INTERFACING

Time : 3 Hours]   *[Max. Marks : 90*

*Instructions to Candidates : Answer any **TEN** questions from Part A, any **FIVE** from Part B, any **FIVE** from part C and any **FIVE** from Part D.*

PART – A

Answer any **TEN** questions :   **(10 × 1 = 10)**

1. Among microcontroller and microprocessor, which one has less access time?

2. How will you select a register bank in 8051?

3. What is the function of program counter?

4. What is the value of SP, when reset is pressed?

5. What is the capacity of internal program memory?

6. What is the use of $\overline{PSEN}$ signal?

7. What is the function of the instruction MOV A, @ R_1?

8. What are the contents of program counter saved, when CALL instruction is executed?

9. What is the operation performed by CLRC instruction?

10. What are vectored interrupts?

11. What is the significance of $C/\overline{T}$?

12. Which port has only I/O function?

PART – B

Answer any **SIX** questions from the following. Each question carries 5 marks :

(6 × 5 = 30)

9. Calculate the radius frequency and energy of the electron in the nth orbit in hydrogen from the following data :

$e = 1.602 \times 10^{-19} c$ $m = 9.1 \times 10^{-31} kg$ $h = 6.625 \times 10^{-34} js$ $\epsilon_0 = 8.854 \times 10^{-12} f/m$ and

$c = 3 \times 10^8 m/s$.

10. The photoelectric work function of a metal is 2.061 eV. Calculate the threshold wavelength and frequency for the metal

$h = 6.625 \times 10^{-34} js$

$c = 3 \times 10^8 m/s$

$1 ev = 1.6 \times 10^{-19} j$.

11. The position and momentum of 1 Kev electron are simultaneously measured. If its position is located within $1 A^0$, what is the percentage of uncertainty in its momentum.

$m = 9.1 \times 10^{-31} kg$ $h = 6.625 \times 10^{-34} js$ $e = 1.6 \times 10^{-19} C$.

12. Calculate the average temperature of the star of mars $2m_{\odot}$ and radius $2.5 R_{\odot}$. Given average temperature of sun = 2.88×10^6 lc.

13. If the luminosity and surface temperature of star Sirius and $26.1 L_{\odot}$ and 10.000 k respectively. Calculate its radius.

Given $\sigma = 5.67 \times 10^{-8} wm^{-2}k^{-4}$ $L_{\odot} = 3.9 \times 10^{26} W$.

14. Calculate the gravitational potential energy of the sun according to linear density model and hence calculate the lifetime of the sun according to gravitational binding energy consideration.

Given :

$G = 6.673 \times 10^{-11} Nm^2 kg^{-2}$

$N_{\odot} = 2 \times 10^{30} kg$

$L_{\odot} = 4.52 \times 10^{26} w$

$R_{\odot} = 7 \times 10^8 m$.

15. The spectroscopic values of Rydberg's constant for the hydrogen and ionized helium are 109677.7 and 109722.4 respectively. Calculate the ratio of e/m for an electron assuming the specific charge of hydrogen ion as 96490 coulomb/gm.

16. The dielectric constant of the gas at NTP is 1.0000684. Calculate the electronic polarizability of He atom if the gas contains 2.7×10^{23} per cubic meter and hence calculate the radius of the He atom.

Given $\epsilon_0 = 8.85 \times 10^{-12}$ F/m.

PART – C

Answer any **TEN** of the following questions. Each question carries 2 marks.

$(10 \times 2 = 20)$

17. (a) The concept of trajectory has no meaning in quantum mechanics. Explain.

    (b) Is Rydberg's constant a constant for all nuclei? Comment.

    (c) Does the De Broglie waves produce dispersion in vacuum? Explain.

    (d) How a white dwarf start attain's stability? Explain.

    (e) Neutron star's are also called pulsar's why?

    (f) Is an atom smaller than a nanometer? How?

    (g) What is piezoelectric effect? Mention any two applications.

    (h) Why dielectric materials are used in capacitors?

    (i) How many hexagonal and pentagonal rings exist in C-60 fullerene?

    (j) The life cycle of a star is decided by its initial mall. Explain.

    (k) Does the color of a star depends on temperature? Explain.

    (l) What type of molecules give rise to the liquid crystal phase?