(Time:3 Hours) (Total Marks:100)

N.B : (1) All questions are compulsory.
(2) Figures to the right indicate maximum marks.
(3) Use of non-programmable calculators is permitted.
(4) Symbols used have their usual meaning

Q1. A) Select correct answer (12)

1 Which is the characteristic of mid-ocean ridges?
(a) shallow focus earthquakes b) High heat flow
(c) Basalt eruption (d) All of these

2 The relation between the acceleration due to gravity (g) and the universal gravitation constant (G),expressed as
(a) $g=\frac{GM}{r}$ (b) $g=\frac{Gr}{M}$ (c) $g=\frac{GM^2}{r}$ (d) $g=\frac{GM}{r^2}$

3 Which is a data transfer instruction in the following?
a) ADD B b) MOV B,C c) CMP M d) ANA D

4 What is the content of Accumulator after the instruction XRA A?
a) 00h b) FF h
c) depends on the data in accumulator
d) same as before the execution of the instruction

5 If the electromagnetic waves are arranged ENEGRY wise, Identify the correct order from the following
a) Radio Waves > Micro Waves > Infrared Waves
b) Radio Waves < Micro Waves < Infrared Waves
c) Radio Waves > Infrared Waves > Micro Waves
d) Radio Waves < Infrared Waves < Micro Waves

6 Radioactivity was discovered by _____.
a) Rutherford b) Becquerel c) Curie d) Roentgen

B) Answer in one sentence (03)

1 Define Medical Geology.
2 State the condition for the zero flag to be set (ie Z = 1).
3 What is amplitude modulation?

C) Fill in the Blanks (5)

1 ---------- means the variation of climate in past geologic time.
2 Superconducting Quantum Interference device also called --------
3 Program counter is a ..... bit register.
4 In 8085 microprocessor, ALU is an abbreviation for .....
(write the full form of ALU)

5 _____ is a device used to measure the absorbed dose received by a body through the exposure to an external ionizing radiation

Q2. A) Attempt any one (8)

1 What is Urbanization? Discuss impact of urbanization and disposal of Industrial Waste on Environment.

2 What is Seismology? What are seismic waves? What are the different types of seismic waves?

B) Attempt any one (8)

1 What is continental drift? Explain the various theories given for its cause.

2 What is Geophysics? What are the different branches of Geophysics .Explain any one of them in detail.

C) Attempt any one (4)

1 What is Polar Wandering? Explain

2 Draw a neat and labeled diagram of an absolute gravimeter.

Q3. A) Attempt any one (8)

1 Write short notes on different registers in 8085 microprocessor.

2 What are the different addressing modes used in 8085 programming language. Explain in brief with an example for each mode.

B) Attempt any one (8)

1 Five data bytes are stored in consecutive memory locations. Write an assembly language program for 8085 microprocessor for adding these data bytes and storing sum and carry (if any) in the next two consecutive locations.

2 Write 8085 instructions for the following.

i) Load the register C with the data 56 h
ii) Copy the data in accumulator
iii) Load HL register pair with the memory address 2050h
iv) Increment data in register C by 1
v) Add the data in register C to the data in accumulator
vi) Copy the sum in Accumulator in the memory location specified by HL register pair
vii) Increment the memory location by 1.(go to next memory location)
viii) Do not perform any operation

C) Attempt any one (4)

1 Write a program to subtract a data byte 37h from 48h. What is the status of carry (borrow) flag after subtracting?

2 State op-code , operand and number of bytes required in each of the following instructions

a) SUB A b) STA 4050h

Q4. A) Attempt any one (8)

1 Explain the properties of α, β and γ radiations.

2 What is digital communication? What are the advantages of digital signals over analog signals?

B) Attempt any one (8)

1 What is Radiotherapy? Explain the different ways of Radiotherapy.

2 Explain Super-Heterodyne receiver along with suitable block diagram.

C) Attempt any one (4)

1 It is required to limit radiation dose of a radiation for the worker to 1 mSv. How long can he stay in mSv/hr radiation field?

2 What is the maximum length of antenna required for FM transmission which is between 88MHz and 108MHz.

Q5. Attempt any Four (20)

1 Draw a neat and labeled diagram of proton magnetometer.

2 Draw a neat diagram of Earth's four major layers.

3 Explain in brief address bus and data bus.

4 Explain the functions of following instructions with examples

a) RAR b) DCX H c) JNC , 4500h

5 Explain Ionization detector and Scintillation detector.

6 Explain the structure of simplex and duplex transmission.

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