

(3 Hours)

[Total Marks : 100]

**N.B. :** (1) All questions from question nos. 1 to 7 are compulsory.  
(2) Figures to right indicate the marks.

1. Attempt **both** the questions :— 10
  - (a) Write notes on WWW, URL and FTP.
  - (b) Define Internet. What are advantages & disadvantages of internet ?
2. Attempt any **three** questions. (5 marks each) :— 15
  - (a) What is E-commerce and explain different types of e-commerce ?
  - (b) What is an Internet Service Provider ? Explain their various types.
  - (c) Write a short note on E-business and E-mail.
  - (d) What is proxy server ? Explain its working with respect to the internet.
3. Attempt any **three** questions (5 marks each) :— 15
  - (a) Explain cellpadding, cellspacing, colspan and rowspan with suitable example.
  - (b) What are the different types of style sheet ? Explain with example.
  - (c) What is a list in HTML? Explain its type using an example.
  - (d) Explain following tags: <meta>, <table>, <pre>, <hr>, <iframe>
4. Attempt any **three** questions (5 marks each) :— 15
  - (a) Explain following operators in Javascript:  
(i) New      (ii) delete      (iii) this      (iv) void
  - (b) Write a program in java script to find the number entered by user in textbox is prime or not using function.
  - (c) Write a short note on Math object.
  - (d) Write short notes on Event handlers giving five examples.
5. Attempt any **three** questions (5 marks each) :— 15
  - (a) Explain concept internal and external DTD.
  - (b) How to create XML document ?
  - (c) What is XML schema ?
  - (d) What is XSL? Explain in brief.
6. Attempt any **three** questions (5 marks each) :— 15
  - (a) What is PHP? Give the features of PHP.
  - (b) Write notes on data types in Php.
  - (c) Explain any five Php/ MySQL functions with example.
  - (d) Explain different types of arrays available in PHP ?
7. Attempt any **three** questions (5 marks each) :— 15
  - (a) What is a cookie ? How to store and retrieve values in cookie in Php ?
  - (b) Explain regular expressions in PHP ?
  - (c) Explain the string operators in PHP with examples.
  - (d) Explain what are PHP sessions ? What is their importance ?



**N.B. :** (1) All questions are compulsory.

(2) Figures to the right indicate full marks for each question.

1. Attempt any one of the following :-

(a) Find  $L^{-1} \left[ \frac{1}{s(s^2 + a^2)} \right]$ . 10

(b) Find the area bounded by  $x + y = 3$  and parabola  $y^2 = 4x$  and X-axis in first quadrant. 10

2. Attempt any three of the following :-

(a) If difference of two complex number  $Z$  and  $\bar{Z}$  is  $12i$  and their product is  $52$  then find them. 5

(b) Show that  $\cosh^{-1} x = \log \left( x + \sqrt{x^2 - 1} \right)$ . 5

(c) Show that  $(1 + i\sqrt{3})^8 + (1 - i\sqrt{3})^8 = -2^8$ . 5

(d) Show that  $\sin 7\theta = 7 \sin \theta - 56 \sin^3 \theta + 112 \sin^5 \theta - 64 \sin^7 \theta$ . 5

3. Attempt any three of the following :-

(a) Check whether the function  $f(z) = 2z - z^2$  is harmonic or not. 5

(b) Evaluate  $\int_C f(z) dz$ , from  $z = 0$  to  $z = i$ , where  $f(z) = \bar{z}$ . 5

(c) Find the image of the line  $x + y + 1 = 0$  under the inversion map  $W = \frac{1}{z}$ . 5

(d) Evaluate  $\oint_C \frac{2z-1}{z(z+2)(2z+1)} dz$  where  $C : |Z| = 1$ , by using Residue theorem. 5

4. Attempt any three of the following :-

(a) Find the Laplace transform  $e^t + \sin 2t \cdot \sin 3t$ . 5

(b) Evaluate  $\int_0^\infty e^{-2t} t^2 \sin 3t$  using Laplace transforms. 5

(c) Find inverse Laplace transform of  $\tan^{-1} \left( \frac{2}{s} \right)$ . 5

(d) Find inverse Laplace transform  $\frac{1}{(s-2)(s+2)^2}$ . 5

[TURN OVER]



5. Attempt any **three** of the following :-

(a) Evaluate  $\int_0^{\infty} \frac{x^7}{7^x} dx$ . 5

(b) Evaluate the integral  $\int_0^1 \sqrt{x \log \frac{1}{x}} dx$ . 5

(c) Prove that  $\operatorname{erf}(-x) + \operatorname{erfc}(x) = 2$ . 5

(d) Using D.U.I.S. rule prove that  $\int_0^{\infty} \frac{\tan^{-1}(ax)}{x(1+x^2)} dx = \frac{\pi}{2} \log(1+a)$ . 5

6. Attempt any **three** of the following :-

(a) Find a Fourier series to represent  $f(x) = x^2$  in  $(0, 2\pi)$ . 5

(b) Find the Fourier sine transform of  $F(t) = e^{-t} + 2e^{-2t} + 3e^{-3t}$ . 5

(c) Find the Fourier transform of  $f(t) = e^{-|t|}$ . 5

(d) Obtain half range sine series for  $x \sin x$  in  $(0, \pi)$ . 5

7. Attempt any **three** of the following :-

(a) Evaluate  $\int_0^{\pi/2} \int_0^{\pi/2} \int_0^a r^4 \sin \theta dr d\theta d\phi$ . 5

(b) Find the volume of the solid S bounded by the surfaces  $y = x$ ,  $y = x^2$ ,  $z = x$  and  $z = 0$  by using triple integral. 5

(c) Evaluate  $\iint xy(x+y) dx dy$  over the area between  $y = x^2$  and  $y = x$ . 5

(d) Evaluate  $\int_0^1 \int_0^{\sqrt{1-y^2}} 4y dx dy$ . 5



(3 Hours)

[Total Marks : 100]

1. Attempt following questions :-

- (a) Explain flag register in 8085. 5
- (b) Write a short note on SFRs of microcontroller 8051. 5

2. Attempt any **three** questions from the following :-

- (a) What is a tri-state buffer ? Explain its types with suitable diagrams. 5
- (b) What is a decoder ? Explain 3 to 8 decoder in detail. 5
- (c) What is latch? Describe its function. 5
- (d) Differentiate between SRAM and DRAM. 5

3. Attempt any **three** questions from the following :-

- (a) Write a short note on hardware interrupts of microprocessor 8085. 5
- (b) Interpret each flag if flag register of microprocessor 8085 contains i) 54H ii) 45H. 5
- (c) Write a short note on System bus of microprocessor 8085. 5
- (d) Explain the following pins of microprocessor 8085 in detail i) TRAP ii) ALE. 5

4. Attempt any **three** questions from the following :-

- (a) Explain following instructions in microprocessor 8085. 5
  - (i) ADI 4AH (ii) CMP B (iii) LDAX B (iv) DAD D (v) MOV B,C
- (a) What are different addressing modes in 8085? Explain with examples. 5
- (b) Write an assembly language program to multiply two 8-bit numbers stored at location 2030H and 2031H in microprocessor 8085. Store the result in memory location 2032H and carry in 2033H if generated. 5
- (c) With the help of examples explain data transfer operations. 5

5. Attempt any **three** questions from the following :-

- (a) What is a bus ? Explain the system bus structure in modern computer system. 5
- (b) Explain the concept of cache memory. 5
- (c) What is RAID? Explain its characteristics. 5
- (d) Describe basic functional units of CPU in a computer system. 5

6. Attempt any **three** questions from the following :-

- (a) Explain various interrupts in 8051. 5
- (b) Explain serial communication in 8051. 5
- (c) Describe the PSW register of 8051 microcontroller. 5
- (d) Explain internal memory structure of 8051 microcontroller. 5

7. Attempt any **three** questions from the following :-

- (a) Explain Direct addressing mode with the help of examples. 5
- (b) Explain port 1 in 8051 microcontroller. 5
- (c) Explain the following instructions - 5
  - (i) MOV A,@RO (ii) CLR A (iii) SETB C (iv) INC A (v) MUL AB.
- (d) Explain different rotate instructions in 8051. 5



**N.B. :** (1) All questions are **compulsory**.

(2) Draw **neat** and labelled diagram wherever **necessary**.

(3) Write answer to a new question on a **fresh page**.

(4) **Figures** to the **right** indicate **maximum** marks.

1. Answer the following :-

10

- (a) List and explain the disadvantages of file-processing system ?
- (b) List and explain E. F. Codd's relational database rules.

2. Answer any 3 out of 4 :-

15

- (a) List the system applications where database is widely used.
- (b) List and explain the different types of database users.
- (c) What is the purpose of using DBMS ?
- (d) Write a short note on database architecture.

3. Answer any 3 out of 4 :-

15

- (a) Explain the different types of relationships with examples ?
- (b) Explain the different levels of data abstraction.
- (c) What are the advantages and disadvantages of hierarchical data model ?
- (d) Write a short note on entity relationship data model.

4. Answer any 3 out of 4 :-

15

- (a) Explain the ER design issues.
- (b) Write a short note on normalization.
- (c) List and explain the different types of relational database keys ?
- (d) Explain the terms generalization, specialization and aggregation ?

5. Answer any 3 out of 4 :-

15

- (a) What is query language ? Explain relational algebra:
- (b) Explain the basic relational algebra operators with example ?
- (c) Write a short note on relational calculus.
- (d) Distinguish between relational algebra and relational calculus.

6. Answer any 3 out of 4 :-

15

- (a) Define constraints. Explain the types of constraints with examples.
- (b) List and explain the aggregate functions with examples.
- (c) Define view. Differentiate between tables and views.
- (d) List and explain the different types of joins with examples.

7. Answer any 3 out of 4 :-

15

- (a) What is a transaction ? Explain the lifecycle of a transaction.
- (b) Explain the properties of transactions ?
- (c) What is concurrency control ? Why is it needed ?
- (d) Write a short note on time-stamp based protocol.



(N.B. : All questions from Q. 1 to Q. 7 are compulsory)

1. Attempt the following:
  - (a) Define Computer Network. Explain LAN, MAN and WAN. 5
  - (b) Explain analog and digital signal with diagram. 5
2. Attempt any **three** from the following :-
  - (a) State the characteristics and explain the components of data communication. 5
  - (b) What is protocol ? Explain the elements of protocol. 5
  - (c) Distinguish between Low pass and Band pass channel. 5
  - (d) Write short note on Half Duplex and Full Duplex. 5
3. Attempt any **three** from the following :-
  - (a) What is the OSI model ? List the layers and explain the application layer. 5
  - (b) Explain the structure of TCP/IP protocol. 5
  - (c) What is subnet ? Why do we use subnetting ? 5
  - (d) Explain Addressing IPv4. 5
4. Attempt any **three** from the following :-
  - (a) What is quantization ? 5
  - (b) State and explain analog modulation methods. 5
  - (c) What is checksum ? Explain with example. 5
  - (d) Explain error and error classification with example. 5
5. Attempt any **three** from the following :-
  - (a) Explain Digital to Analog conversion with example. 5
  - (b) Explain any two guided media. 5
  - (c) Explain transmission impairment. 5
  - (d) What are transmission modes in terms of direction ? 5
6. Attempt any **three** from the following :-
  - (a) List the types of Network topologies ? Explain any two with the help of diagram. 5
  - (b) What is routing ? Explain. 5
  - (c) Define Packet ? Explain packet switching. 5
  - (d) Write short note on i) circuit switching and ii) message switching. 5
7. Attempt any **three** from the following:
  - (a) Distinguish between IPv4 and IPv6. 5
  - (b) Write short note on IPv6 transition mechanism. 5
  - (c) Explain UniCast, MultiCast and BroadCast. 5
  - (d) Explain IPv6 auto configuration via DHCP. 5