ELECTRONIC SCIENCE

Paper II

Time Allowed : 75 Minutes] **[Maximum Marks : 100**

Note : This Paper contains **Fifty (50)** multiple choice questions, each question carrying **Two (2)** marks. Attempt *All* questions.

1. For a certain 12 V zener diode, a 10 mA change in zener current produces a 0.1 V change in zener voltage. The zener impedance for this current, change is :
   (A) 0.1 ohm
   (B) 1 ohm
   (C) 10 ohm
   (D) 100 ohm

2. Which of the following statements is *correct* :
   (A) more number of electron-hole pairs will be generated in silicon than in germanium at room temperature
   (B) less number of electron-hole pairs will be generated in silicon than germanium at room temperature
   (C) number of electron-hole pairs generated are equal both in silicon and germanium at room temperature
   (D) Conductivity of silicon is more than that of germanium at room temperature

3. The process of growth, by which an amount of material is set down upon a crystalline substrate while the overall single-crystal structure is still preserved, is known as..... .
   (A) Impurity diffusion
   (B) Doping
   (C) Epitaxy
   (D) Ion implantation

4. A major factor that limits the high frequency gain of MOS transistors is.....caused by overlapping of the gate electrode and the drain.
   (A) Overall impedance
   (B) Parasitic capacitance
   (C) Parasitic conductance
   (D) Overall conductance

5. Metallization in IC fabrication is carried by :

(A) CVD technique

(B) EB evaporation technique

(C) ALD technique

(D) Oxidation technique

6. A circuit consists of two resistances R_1 and R_2 in parallel. The total current passing through the circuit is I_T, then the current passing through R_1 is :

(A) $\frac{R_1}{R_1 + R_2} I_T$

(B) $\frac{R_1 + R_2}{R_1} I_T$

(C) $\frac{R_2}{R_1 + R_2} I_T$

(D) $\frac{I_T}{R_1 [R_1 + R_2]}$

7. Laplace transform of first derivative of a function $f(t)$ is :

(A) $\frac{F(S)}{S}$

(B) $S\,F(S) - f(0)$

(C) $F(S) - f(0)$

(D) $S\,F(S) - S\,f(0)$

8. Z-transform of $x(n) = \delta(n - k)$ for $k > 0$ is :

(A) Z^K

(B) 1

(C) Z^{-K}

(D) K

9. One of the following properties of transfer function is *correct* :

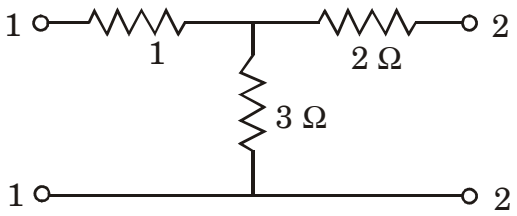
(A) The transfer function is not a ratio of polynomials in S

(B) All complex poles and zeros must not occur in conjugate pairs

(C) The real parts of all poles must be positive

(D) The coefficients of numerator polynomial P(S) and denominator polynomial Q(S) must be real

10. What is the driving-point impedance of the following circuit (consider 1-1 port as input) ?



(A) 3 Ω

(B) 5 Ω

(C) 4 Ω

(D) 2.2 Ω

11. The average value of a half wave rectifier voltage with a peak value of 200 V is :

(A) 63.7 V

(B) 127.3 V

(C) 141 V

(D) 0 V

12. A DC voltage regulated power supply normally uses :

(A) only amplifier circuit

(B) only negative feedback

(C) amplifier and error feedback

(D) only filter circuit

13. Two inputs sin ωt and cos ωt are fed to two terminals of a differential amplifier. The output will be :

(A) $\sin \omega t + \cos \omega t$

(B) $\sin \omega t - \cos \omega t$

(C) 0

(D) $\sin \omega t \cdot \cos \omega t$

14. For an inverting amplifier, the input is fed through a resistance R_1 and let R_2 be the feedback resistance. Then the input resistance is approximately :

(A) R_1^2 / R_2

(B) R_2^2 / R_1

(C) $\sqrt{R_1 R_2}$

(D) R_1

15. If A is the amplifier gain and B is the feedback factor, then condition for generating oscillations is :

(A) $AB = -1$

(B) $AB = +1$

(C) $AB = 0$

(D) $AB = \infty$

16. The most suitable gate for comparing two bits is :

(A) AND

(B) OR

(C) NAND

(D) XOR

17. On a Karnaugh map, grouping the 0's produces :

(A) a product of sums expression

(B) a sum of products expression

(C) a "don't care" condition

(D) AND-OR logic

18. A 4-bit parallel adder can add :

(A) two 4-bit binary numbers

(B) two 2-bit binary numbers

(C) four bits at a time

(D) four bits in a sequence

19. A modulus 5 ring counter requires a minimum of :

(A) ten flip-flops

(B) five flip-flops

(C) four flip-flops

(D) twleve flip-flops

20. A memory with 256 addresses has :

(A) 256 address lines

(B) 6 address lines

(C) 1 address line

(D) 8 address lines

21. Which of the following is an example of embedded system for data communication ?

(A) USB for mass storage

(B) Digital camera

(C) Network router

(D) Music player

22. What is the minimum number of I/O lines required to interface a 16 key matrix keyboard ?

(A) 16

(B) 8

(C) 32

(D) 4

23. What is the minimum number of interface lines required for implementing I2C interface ?

(A) 2

(B) 1

(C) 3

(D) 4

24. The serial port of the standard 8051 architecture is :

(A) Simplex

(B) Half duplex

(C) 'Receive' buffered

(D) 'Transmit' buffered

25. Which is the addressing mode for the instruction MOVC A, @ A + DPTR ?

(A) Direct

(B) Indexed

(C) Immediate

(D) Register

26. What will be the output of the following C program module ?

```
main( )
{    int i, j;
     i = 0;
     do
     {   j = i * i;
     i++;
     }   while (j < = 6);
     print ("%d %d", i, j);
}
```

(A) 2 4

(B) 3 4

(C) 4 9

(D) 4 4

27. The resolution of a SVGA monitor is :

(A) 320 × 200

(B) 320 × 400

(C) 640 × 640

(D) 640 × 480

28. The data structure which allows storage of multiple values in the same variable name with a subscript is called as :

(A) Array

(B) Tree

(C) List

(D) Que

29. Which of the following is *not* a serial port ?

(A) USB

(B) Centronix port

(C) RS232 C

(D) 9 pin D connector on a PC motherboard

30. The correct sequence for file handling in C is :

(A) Define file pointer, use fopen, read/write data, close

(B) Use fopen, define file pointer, read/write data, close

(C) Use fopen, close, define file pointer, read/write data

(D) Define file pointer, read/write data use fopen, close

31. A transmission line has a VSWR of 2, The reflection coefficient is :

(A) $\frac{1}{3}$

(B) 0

(C) $\frac{1}{4}$

(D) $\frac{1}{2}$

32. A strip transmission line is formed over a dielectric medium with $\in_r = 4$. The width of the strip is 6 mm and the thickness of dielectric is 2 mm. The characteristic impedance of this line is :

(A) $\frac{1}{20}\sqrt{\frac{\mu_0}{\in_0}}$

(B) $\sqrt{\frac{\mu_0}{\in_0}}$

(C) $2\sqrt{\frac{\mu_0}{\in_0}}$

(D) $\frac{1}{10}\sqrt{\frac{\mu_0}{\in_0}}$