

GANPAT UNIVERSITY

PH.D. ENTRANCE TEST JULY – 2017

FACULTY OF ENGINEERING & TECHNOLOGY

[COMPUTER SCIENCE & INFORMATION TECHNOLOGY]

SECTION – B

Instruction:

- (a) The Question Paper consists of two Parts.
- (b) Part – I of Question Paper consists 25 objective types of questions each of one marks. Correct answer is to be written as A, B, C or D in given separate answer sheet.
- (c) Part – II of Question Paper consists 5 descriptive type of questions each of 5 marks. The answers are to be written in given answer book.
- (d) All Questions are compulsory.

PART - I

- Q. 1 Let S be an infinite set and $S_1, S_2, S_3, \dots, S_n$ be sets such that $S_1 \cup S_2 \cup S_3 \cup \dots \cup S_n = S$ then
- A. atleast one of the sets S_i is a finite set
 - B. not more than one of the set S_i can be infinite
 - C. atleast one of the sets S_i is an infinite set
 - D. none of these
- Q. 2 The convergence of which of the following method is sensitive to starting value?
- A. False position
 - B. Gauss seidal method
 - C. Newton-Raphson method
 - D. All of these
- Q. 3 Simplified expression of half adder carry is
- A. $c=xy+x$
 - B. $c=y+x$
 - C. $c=xy+y$
 - D. $c=xy$
- Q. 4 Multiple variable xor is defined as
- A. inverted or function
 - B. prime function
 - C. even function
 - D. odd function
- Q. 5 During the execution of the instructions, a copy of the instructions is placed in the _____.
- A. Register
 - B. RAM
 - C. System heap
 - D. Cache
- Q. 6 In reverse polish notation, expression $A*B+B*D$ is written as
- A. $AB*CD*+$
 - B. $A*BCD*+$
 - C. $AB*CD+*$
 - D. $A*B*CD+$
- Q. 7 If a processor clock is rated as 1250 million cycles per second, then its clock period is _____.
- A. $1.9 * 10^{-10}$ sec
 - B. $1.6 * 10^{-9}$ sec
 - C. $1.25 * 10^{-10}$ sec
 - D. $8 * 10^{-10}$ sec
- Q. 8 An n-bit microprocessor as
- A. n-bit program counter
 - B. n-bit address register
 - C. n-bit ALU
 - D. n-bit instruction register
- Q. 9 The space factor when determining the efficiency of algorithm is measured by
- A. Counting the maximum memory needed by the algorithm
 - B. Counting the minimum memory needed by the algorithm
 - C. Counting the average memory needed by the algorithm
 - D. Counting the maximum disk space needed by the algorithm

- Q. 10 Which of the following is not the required condition for binary search algorithm?
- A. The list must be sorted
B. there should be the direct access to the middle element in any sublist
C. There must be mechanism to delete and/or insert elements in list
D. none of above
- Q. 11 When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return
- A. FAEKCDHBG
B. FAEKCDHGB
C. EAFKHDCBG
D. FEAKDCHBG
- Q. 12 If L_1 and L_2 are context free language and R a regular set, then which one of the languages below is not necessarily a context free language?
- A. $L_1 L_2$
B. $L_1 \cap L_2$
C. $L_1 \cap R$
D. $L_1 \cup L_2$
- Q. 13 If L be a language recognizable by a finite automaton, then language front $\{L\} = \{w \text{ such that } w \text{ is prefix of } v \text{ where } v \in L\}$, is a
- A. regular language
B. context-free language
C. context-sensitive language
D. recursive enumeration language
- Q. 14 Which of the following can be accessed by transfer vector approach of linking?
- A. external data segments
B. external sub-routines
C. data located in other procedure
D. all of these
- Q. 15 The best way to compare the different implementations of symbol table is to compare the time required to
- A. add a new name
B. make an inquiry
C. add a new name and make an inquiry
D. all of these
- Q. 16 What is contained in the page table?
- A. Base address of each frame and corresponding page number
B. memory address and corresponding page number
C. file name and corresponding page number
D. none of the above
- Q. 17 In virtual memory systems, Dynamic address translation
- A. is the hardware necessary to implement paging
B. stores pages at a specific location on disk
C. is useless when swapping is used
D. None of the above
- Q. 18 The address of the next instruction to be executed by the current process is provided by the
- A. CPU registers
B. program counter
C. process stack
D. pipe
- Q. 19 Which one of the following is used to define the structure of the relation, deleting relations and relating schemas?
- A. DML(Data Manipulation Language)
B. DDL(Data Definition Language)
C. Query
D. Relational Schema
- Q. 20 A lock that allows concurrent transactions to access different rows of the same table is known as a
- A. Field-level lock
B. Row-level lock
C. Table-level lock
D. Database-level lock
- Q. 21 _____contains information that defines valid values that are stored in a column or data type.
- A. View
B. Rule
C. Index
D. Default

- Q. 22 Which layer is responsible for process to process delivery?
- | | |
|------------------|--------------------|
| A. network layer | B. transport layer |
| C. session layer | D. data link layer |
- Q. 23 Routing table of a router keeps track of
- | | |
|---|---|
| A. MAC address assignments | B. Port assignments to network devices |
| C. distribute IP address to network devices | D. Routes to use for forwarding data to its destination |
- Q. 24 Error detecting code is
- | | |
|--|--|
| A. an error-detecting code based on a summation operation performed on the bits to be checked | B. a check bit appended to an array of binary digits to make the sum of all the binary digits. |
| C. a code in which each expression conforms to specify rules of construction, so that if certain errors occur in an expression, the resulting expression will not conform to the rules of construction and thus the presence of the error is detected. | D. None of the above |
- Q. 25 The topology with highest reliability is?
- | | |
|------------------|------------------|
| A. Bus topology | B. Star topology |
| C. Ring Topology | D. Mesh Topology |

PART – II

- | | | |
|------|--|---------|
| Q. 1 | Explain the ACID properties of DBMS transactions in detail. | 5 Marks |
| Q. 2 | Draw the logic diagram corresponding to following expressions without simplifying them | 5 Marks |
| | (i) $(A+B)(C+D)(A'+B+D)$ | |
| | (ii) $(AB+A'B')(CD'+C'D)$ | |
| Q. 3 | Describe the components (data structures and operations) involved when hashing is used. | 5 Marks |
| Q. 4 | Describe and analyze and algorithm to solve Partition in time $O(nM)$, where n is the size of the input set and M is the sum of the absolute values of its elements. Why doesn't this algorithm imply that P=NP? | 5 Marks |
| Q. 5 | The physical layer service is a non-confirmed service. Assume that some bits of data are lost during transmission over physical media. Which layer will detect the loss and take some remedial measures? Explain any one method clearly depicting how this operation is performed. | 5 Marks |

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PH.D. ENTRANCE TEST JULY – 2017

FACULTY OF ENGINEERING & TECHNOLOGY

[COMPUTER SCIENCE & INFORMATION TECHNOLOGY]

SECTION – B

Answer Key

| | |
|-------|---|
| Q. 1 | C |
| Q. 2 | C |
| Q. 3 | D |
| Q. 4 | D |
| Q. 5 | D |
| Q. 6 | A |
| Q. 7 | D |
| Q. 8 | D |
| Q. 9 | A |
| Q. 10 | C |
| Q. 11 | B |
| Q. 12 | B |
| Q. 13 | A |
| Q. 14 | B |
| Q. 15 | D |
| Q. 16 | A |
| Q. 17 | A |
| Q. 18 | B |
| Q. 19 | B |
| Q. 20 | B |
| Q. 21 | C |
| Q. 22 | B |
| Q. 23 | D |
| Q. 24 | C |
| Q. 25 | D |

GANPAT UNIVERSITY
PH.D. ENTRANCE TEST JULY – 2017
FACULTY OF ENGINEERING AND TECHNOLOGY
MECHANICAL ENGINEERING
SECTION – B

Instruction:

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- (b) Part – I of Question Paper consists 25 objective types of questions each of one marks. Correct answer is to be write as A, B, C or D in given separate answer sheet.
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- (d) All Questions are compulsory.

Part-1 Objective Questions (25 Questions - 25 Marks)

- 1 Design of shafts made of brittle materials is based on
 - (a) Guest's theory
 - (b) Rankine's theory
 - (c) St. Venant's theory
 - (d) Von Mises theory
- 2 Critical speed is the speed at which the shaft tends to vibrate violently in
 - (a) Transverse direction
 - (b) Longitudinal direction
 - (c) Linear direction
 - (d) None of the above
- 3 Diamond riveting is used for
 - (a) Structural work
 - (b) Boiler work
 - (c) Structural and Boiler
 - (d) None of the above
- 4 Continuity equation deals with the law of conservation of
 - (a) Mass
 - (b) Momentum
 - (c) Energy
 - (d) None of the above
- 5 Heat transfer by radiation is encountered least in
 - (a) Boiler furnace
 - (b) Insulated steam pipe
 - (c) Electric bulb
 - (d) Nuclear reactor
- 6 Streamlines, path lines and streak lines are virtually identical for
 - (a) Uniform flow
 - (b) Flow of ideal fluids
 - (c) Steady flow
 - (d) Non uniform flow
- 7 The top of the piston in two-stroke engine is
 - (a) Flat
 - (b) Slanted
 - (c) Crown shaped
 - (d) Convex shaped
- 8 Alloying element mainly used to improve endurance strength of steel material is
 - (a) Nickel
 - (b) Vanadium
 - (c) Molybdenum
 - (d) Tungsten
- 9 Friction at tool-chip interface can be reduced by
 - (a) Decreasing rake angle
 - (b) Increasing depth of cut
 - (c) Decreasing cutting speed
 - (d) Increasing cutting speed
- 10 A comparator instrument is
 - (a) Tool makers microscope
 - (b) Go/No Go gauge
 - (c) Optical interferometer
 - (d) Dial gauge
- 11 MRP indicates
 - (a) Materials Reordering Point
 - (b) Materials Reordering Planning
 - (c) Materials Requirements Planning
 - (d) Materials Requirements Points
- 12 A function of two variables $z = f(x, y)$ represents a
 - (a) Curve in a plane
 - (b) Curve in a space
 - (c) Surface in a plane
 - (d) Surface in a space
- 13 Impulse-momentum principle is applicable
 - (a) If no external force on body
 - (b) If short time force acts on body
 - (c) When momentum is conserved
 - (d) Wherever Newton's law is applicable
- 14 Klein's construction is used when
 - (a) Crank has uniform acceleration
 - (b) Crank has uniform angular velocity
 - (c) Crank has non-uniform acceleration
 - (d) Crank has non-uniform angular velocity

- 15 Critical damping is a function of
 (a) Mass and Stiffness (b) Mass and Damping co-efficient
 (c) Stiffness and Natural frequency (d) Natural frequency and Damping co-efficient
- 16 Most suitable bearing for carrying very heavy loads with slow speed is
 (a) Hydro-dynamic bearing (b) Ball bearing
 (c) Roller bearing (d) Hydrostatic bearing
- 17 Two pipes of uniform section but different diameters carry water at the same volumetric flow rate. Water properties are the same in two pipes. The Reynolds number, based on the pipe diameter is
 (a) Same in both pipes (b) Larger in narrow pipe
 (c) Smaller in narrow pipe (d) Depends on pipe material
- 18 Heat is rejected by a refrigerant, during a refrigeration cycle in a
 (a) Condenser (b) Evaporator
 (c) Compressor (d) Throttle valve
- 19 Total area under the stress-strain curve of mild steel specimen tested up to failure under tension is a measure of
 (a) Ductility (b) Ultimate strength
 (c) Stiffness (d) Toughness
- 20 Machining of complex shapes on CNC machines requires
 (a) Simultaneous control of x, y and z-axes (b) Simultaneous control of x and y-axes
 (c) Independent control of x and y-axes (d) Independent control of x, y and z-axes
- 21 In drawing operation the metal flows due to
 (a) Ductility (b) Work hardening
 (c) Plasticity (d) Shearing
- 22 A sine bar is specified by
 (a) Its total length (b) Centre distance between two rollers
 (c) Size of rollers (d) Weight of sine bar
- 23 Graphical, simplex and transportation methods are connected with
 (a) Value analysis (b) Linear programming
 (c) Break-even analysis (d) Queuing theory
- 24 Drill jigs are useful for
 (a) Small production (b) Mass production
 (c) Both small and mass production (d) None of these
- 25 The maximum value of $f(x) = \log x/x$
 (a) $1/e$, at $x = 1$ (b) $1/e$, at $x = e$
 (c) 1 , at $x = 1/e$ (d) None of these

Part-2 Descriptive Questions (05 Questions - 25 Marks)

1. Explain design considerations of pattern making.
2. Explain design procedure of limit gauges.
3. Explain about various gas welding techniques with neat sketches.
4. Explain backward cold extrusion process with suitable example.
5. Establish relation between heat and work by Joule's experiment.

GANPAT UNIVERSITY
Faculty of Engineering and Technology
Ph. D. Entrance Examination 2017
SECTION – B (50 Marks)

Part-1 Objective Questions (25 Questions - 25 Marks)

ANSWER OF PAPER

| | | | |
|----|-----|----|-----|
| 1 | (b) | 14 | (b) |
| 2 | (a) | 15 | (a) |
| 3 | (a) | 16 | (d) |
| 4 | (a) | 17 | (b) |
| 5 | (b) | 18 | (a) |
| 6 | (c) | 19 | (d) |
| 7 | (c) | 20 | (a) |
| 8 | (b) | 21 | (c) |
| 9 | (d) | 22 | (b) |
| 10 | (d) | 23 | (b) |
| 11 | (c) | 24 | (b) |
| 12 | (d) | 25 | (a) |
| 13 | (d) | | |

GANPAT UNIVERSITY
PH.D. ENTRANCE TEST JULY – 2017
FACULTY OF ENGINEERING
[CIVIL ENGINEERING]
SECTION – B

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PART - I

- Q. 1 $\oint_C \frac{dz}{z^2 + 4} = \text{_____}$, where C is unit circle.
- (a) $2\pi i$ (b) $4\pi i$
(c) $-2\pi i$ (d) None of these.
- Q. 2 If $y = e^{4x}$ is a solution of $\frac{d^2y}{dx^2} - k \frac{dy}{dx} + 12y = 0$, what is the value of k ?
- (a) 4 (b) 3
(c) 7 (d) 6
- Q. 3 If two Eigen value of $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ are 3 and 15, then the third eigen value is
- (a) 0 (b) 1
(c) 2 (d) 3
- Q. 4 The value of $(1 + \Delta)(1 - \nabla)$ is
- (a) 1 (b) ∇
(c) -1 (d) 0
- Q. 5 An anti – aircraft gun can take a maximum of four shots at an enemy plane moving away from it. The probability of hitting the plane at the first, second, third and fourth shorts are 0.4, 0.3, 0.2 and 0.1 respectively. What is the probability that the plane is hit when all the four shots are fired?
- (a) 0.3507 (b) 0.6976
(c) 0.4383 (d) 0.7351
- Q. 6 The area under the stress-strain curve represents
- A. breaking strength of material B. toughness of material
C. hardness of materials D. energy required to cause failure
- Q. 7 The ratio of direct stress to volumetric strain is known as
- A. Modulus of elasticity B. Modulus of rigidity
C. Bulk modulus D. Poison's ratio
- Q. 8 Resistance of a material against reversal of stress is known as
- A. Tensile strength B. Compressive strength
C. Fatigue strength D. Shear strength

- Q. 9 A propped cantilever beam having uniform cross section throughout a span of 4 m carried a uniformly distributed load of 20 kN/m. Reaction at prop will be
 A. 80 kN B. 20 kN
 C. 30 kN D. 40 kN
- Q. 10 Loss of stress with constant strain in steel is called
 A. Relaxation B. Creep
 C. Shrinkage D. Ductility
- Q. 11 Contact pressure beneath a rigid footing resting on cohesive soil is
 A. Less at edges compared to centre B. More at edges compare to centre
 C. Uniform throughout D. none of these
- Q. 12 Negative skin friction in soil is considered when the pile is constructed through a
 A. filled material B. dense coarse sand
 C. over consolidated stiff clay D. dense fine sand
- Q. 13 Sand drains are used to
 A. Reduce settlement B. Accelerate consolidation
 C. Increase permeability D. Transfer load
- Q. 14 The method of describing fluid motion in which a single fluid particle is selected is called
 A. Eulerian method B. Newton's method
 C. Lagrangian method D. Reynold's method
- Q. 15 In case of turbulent flow, the frictional resistance is proportional to
 A. Velocity B. Square of velocity
 C. Square root of velocity D. None of the above
- Q. 16 Which of the following is not a non-dimensional parameter?
 A. Froude number B. Darcy-Weisbach friction factor
 C. Chezy's coefficient D. Mach number
- Q. 17 A pipe of 0.8 m diameter carries a discharge of 0.5024 cum/sec, the velocity of flow is
 A. 0.8 m/sec B. 0.9 m/sec
 C. 1.0 m/sec D. 1.1 m/sec
- Q. 18 Which of the following canal structures is used to remove surplus water from an irrigation channel into natural drain?
 A. canal escape B. canal outlet
 C. canal fall D. canal regulator
- Q. 19 The sewage treatment unit, which work on aerobic decomposition of organic matter, is
 A. Trickling filter B. Imhoff tank
 C. Sludge digestion tank D. Septic tank
- Q. 20 The ratio of 'flow through period' to 'detention period' in a sedimentation tank is called
 A. Surface loading B. Settling velocity
 C. Theoretical velocity D. Displacement efficiency
- Q. 21 Sewers are generally laid, starting from their
 A. Off take point B. Outfall point
 C. Mid point D. Any point along the alignment
- Q. 22 The relation between Theoretical Oxygen Demand (TOD), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) is given by
 A. $TOD > BOD > COD$ B. $TOD > COD > BOD$
 C. $BOD > TOD > COD$ D. $BOD > COD > TOD$
- Q. 23 If the difference in elevation of an edge of the pavement 9 m wide and its crown is 15 cm, the camber of the pavement is
 A. 1 in 60 B. 1 in 30
 C. 1 in 45 D. 1 in 15

- Q. 24 In grade of 85/25 grade of bitumen, the figure 25 represents
A. penetration B. softening point
C. flash point D. fire point
- Q. 25 Generally, the transition curve used on highways is
A. Cubic spiral B. cubic parabola
C. Bernullis lemniscates D. both (A) and (B)

PART – II

| | | |
|------|--|---------|
| Q. 1 | Why Mass Transportation System is important for our country ? | 5 Marks |
| Q. 2 | Explain the importance of continuity, energy and momentum equations use in hydraulics. | 5 Marks |
| Q. 3 | What is difference in gravity and earthen dam. | 5 Marks |
| Q. 4 | Explain different kind of failures of frame structure | 5 Marks |
| Q. 5 | Explain BOD and COD | 5 Marks |

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FACULTY OF ENGINEERING & TECHNOLOGY

[CIVIL ENGINEERING]

SECTION – B

Answer Key

| | |
|-------|---|
| Q. 1 | D |
| Q. 2 | C |
| Q. 3 | A |
| Q. 4 | A |
| Q. 5 | B |
| Q. 6 | D |
| Q. 7 | C |
| Q. 8 | C |
| Q. 9 | C |
| Q. 10 | B |
| Q. 11 | B |
| Q. 12 | A |
| Q. 13 | B |
| Q. 14 | C |
| Q. 15 | B |
| Q. 16 | C |
| Q. 17 | C |
| Q. 18 | A |
| Q. 19 | A |
| Q. 20 | D |
| Q. 21 | B |
| Q. 22 | B |
| Q. 23 | B |
| Q. 24 | A |
| Q. 25 | A |

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PH.D. ENTRANCE TEST JULY – 2017
FACULTY OF ENGINEERING AND TECHNOLOGY
ELECTRONICS AND COMMUNICATION ENGINEERING
SECTION – B

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PART I

Questions 1 to 25 carry One mark each.

1. A person moving through a tuberculosis prone zone has a 50% probability of becoming infected. However, only 30% of infected people develop the disease. What percentage of people moving through a tuberculosis prone zone remains infected but does not show symptoms of disease?
a. 15 b. 33 c. 35 d. 37
2. Ram and Ramesh appeared in an interview for two vacancies in the same department. The probability of Ram's selection is $1/6$ and that of Ramesh is $1/8$. What is the probability that only one of them will be selected?
a. $47/48$ b. $1/4$ c. $13/48$ d. $35/48$
3. The return loss of a device is found to be 20 dB. The voltage standing wave ratio (VSWR) and magnitude of reflection coefficient are respectively
a. 1.22 and 0.1 b. -1.22 and 0.1
c. 0.81 and 0.1 d. 2.44 and 0.2
4. If the characteristic equation of difference equation
$$\frac{d^2y}{dx^2} + 2\alpha \frac{dy}{dx} + y = 0$$
has two equal roots, then the values of α are
a. ± 1 b. 0, 0 c. $\pm j$ d. $\pm 1/2$
5. The determinant of matrix A is 50 and the determinant of matrix B is 5. The determinant of matrix AB is _____.
a. 45 b. 10 c. 55 d. 250
6. Let $x(t) = \cos(10\pi t) + \cos(30\pi t)$ be sampled at 20 Hz and reconstructed using an ideal low-pass filter with cut-off frequency of 20 Hz. The frequency/frequencies present in the reconstructed signal is/are
a. 5 Hz and 15 Hz only c. 10 Hz and 15 Hz only
b. 5 Hz, 10 Hz and 15 Hz only d. 5 Hz only

7. Consider the sequence $x[n] = a^n u[n] - b^n u[n]$, where $u[n]$ denotes the unit-step sequence and $0 < |a| < |b| < 1$. The region of convergence (ROC) of the z-transform of $x[n]$ is
- $|z| > |a|$
 - $|z| > |b|$
 - $|z| < |a|$
 - $|a| < |z| < |b|$
8. Two systems with impulse responses $h_1(t)$ and $h_2(t)$ are connected in parallel. Then the overall impulse response of the cascaded system is given by
- Product of $h_1(t)$ and $h_2(t)$
 - Convolution of $h_1(t)$ and $h_2(t)$
 - Sum of $h_1(t)$ and $h_2(t)$
 - Subtraction of $h_1(t)$ and $h_2(t)$
9. A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles
- An AND gate
 - An OR gate
 - An XOR gate
 - A NAND gate
10. The autocorrelation function of a rectangular pulse of duration T is
- A rectangular pulse of duration T
 - A rectangular pulse of duration 2T
 - A triangular pulse of duration T
 - A triangular pulse of duration 2T.
11. The power spectral density of a deterministic signal is given by $\sin(f)/f$ where ' f ' is frequency. The autocorrelation function of this signal in the time domain is
- A rectangular pulse
 - A delta function
 - A *sinc* pulse
 - A triangular pulse
12. The fanout of a MOS logic gate is higher than that of TTL gates because of its
- Low input impedance
 - High output impedance
 - Low output impedance
 - High input impedance
13. When an amplifier is provided with current series feedback, its
- Input and output impedance both decrease
 - Input impedance increases and output impedance decreases
 - Input impedance decreases and output impedance increases
 - Input and output impedance both increase
14. The drift current in the semiconductors depends upon
- Only the electric field
 - Only the carrier concentration gradient
 - Both the electric field and the carrier concentration
 - Both the electric field and the carrier concentration gradient

15. A Zener diode, when used in voltage stabilization circuits, is biased in
- Reverse bias region below the breakdown voltage
 - Reverse breakdown region
 - Forward bias region
 - Forward bias constant current mode
16. In the sum of product function $f(X, Y, Z) = \sum(2,3,4,5)$, the prime implicants are
- $\bar{X}Y, X\bar{Y}$
 - $\bar{X}Y\bar{Z}, \bar{X}YZ, X\bar{Y}$
 - $\bar{X}Y, X\bar{Y}\bar{Z}, X\bar{Y}Z$
 - $\bar{X}Y\bar{Z}, \bar{X}YZ, X\bar{Y}\bar{Z}, X\bar{Y}Z$
17. In a MOSFET operating in the saturation region, the channel length modulation effect causes
- An increase in the gate-source capacitance
 - A decrease in the Transconductance
 - A decrease in the unity-gain cutoff frequency
 - A decrease in the output resistance
18. A circuit has a source voltage of 100 V and two 50-ohm resistors connected in series. If the reference point for this circuit is placed between the two resistors, what would be the voltage at the reference point?
- 10 V
 - 40 V
 - 30 V
 - 50 V
19. The main advantage of TDM over FDM is that it
- Needs less power
 - Needs less bandwidth
 - Needs simple circuitry
 - Gives better S/N ratio
20. Consider the following statements for a metal oxide semiconductor field effect transistor (MOSFET):
- As channel length reduces, OFF-state current increases.
 - As channel length reduces, output resistance increases.
 - As channel length reduces, threshold voltage remains constant.
 - As channel length reduces, ON current increases.
- Which of the above statements are INCORRECT?
- 1 and 2
 - 1 and 4
 - 2 and 3
 - 3 and 4
21. Consider a two-port network with the transmission matrix: $T = \begin{bmatrix} A & B \\ C & D \end{bmatrix}$. If the network is reciprocal, then
- $T^{-1} = T$
 - $T^2 = T$
 - Determinant $(T) = 0$
 - Determinant $(T) = 1$

22. The modes in a rectangular waveguide are denoted by $\frac{TE_{mn}}{TM_{mn}}$ where m and n are the eigen numbers along the larger and smaller dimensions of the waveguide respectively. Which one of the following statements are TRUE?
- The TM_{10} mode of the wave does not exist
 - The TE_{10} mode of the wave does not exist
 - The TM_{10} and the TE_{10} modes both exist and have the same cut-off frequencies
 - The TM_{10} and TM_{01} modes both exist and have the same cut-off frequencies
23. Consider a closed surface S surrounding volume V. If \vec{r} is the position vector of a point inside S, with \hat{n} the unit normal on S, the value of the integral $\oiint_S 5\vec{r} \cdot \hat{n} dS$ is
- 3 V
 - 5 V
 - 10 V
 - 15 V
24. An 8085 assembly language program is given below. Assume that the carry flag is initially unset. The content of the accumulator after the execution of the program is
- ```

MVI A, 07H
RLC
MOV B, A
RLC
RLC
ADD B
RRC

```
- 8CH
  - 64H
  - 23H
  - 15H
25. Consider the following statements: In order to generate square wave from a sinusoidal input signal one can use
- Schmitt trigger circuit
  - Clippers and amplifiers
  - Monostable multivibrators
- 1 alone
  - 1 and 2
  - 2 and 3
  - 1,2 and 3