VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM

(Deemed to be University under section 3 of the UGC Act 1956)

Civil Engineering

Instructions / Note:

1. Answer all the questions. Each question carries one mark.
2. No negative marks for wrong answers.
3. Read each question carefully and answer in the OMR sheet provided for each question with only blue/ black pen to fill the circles in the OMR Sheet.
4. Return the question paper along with the OMR sheet.

Time: 90 Minutes
Venue: _____. [35X1=35]

Part-B

1. The rise of water table above the ground surface causes

A. Equal increase in pore water pressure and total stress
B. Equal decrease in pore water pressure and total stress
C. increase in pore water pressure and decrease in total stress
D. decrease in pore water pressure and increase in total stress

2. The liquid limit (LL), plastic limit (PL) and shrinkage limit (SL) of a cohesive soil satisfy the relation

A. LL > PL > SL
B. LL < PL < SL
C. LL > PL < SL
D. LL < PL > SL

3. In Terzaghi's analysis, the loading conditions are similar to that on a retaining wall under

A. Active pressure
B. Effective pressure
C. Passive pressure
D. Neutral pressure

4. What is the maximum permissible tolerance for length and width respectively?

A. ± 3mm and ± 6mm
B. ± 6mm and ± 3mm

C. ± 3cm and ± 6cm

D. ± 6cm and ± 3cm

5. What is the loading rate used in compressive strength test?
   A. 14 N/mm^2 per hour
   B. 14 N/mm^2 per minute
   C. 20 N/mm^2 per minute
   D. 40 N/mm^2 per hour
6. Which of the below is a global scale environmental issue?
   A. Eutrophication
   B. Regional ozone
   C. Climate change
   D. Pollution
7. When does Sustainable Maintenance take place?
   A. During the design phase of a building's development
   B. During the construction phase of a building' s development
   C. After the construction of a building
   D. None of the options given
8. Green building practices include _____.
   A. Only energy efficiency
   B. Only recycled materials
   C. Both energy efficiency and recycled materials
   D. None of the options given
9. Which of the following arrangements in terms of size is true?
   A. Metakaolin<Silica fume<Flyash
   B. Silica fume<Metakaolin<Flyash
   C. Flyash<Silica fume<Metakaolin
   D. Metakaolin<Flyash<Silica fume
10. In geopolymer concrete the alkali activators are used to activate
   A. Sodium silicate
   B. Aluminosilicate

C. Iron oxide Aluminosilicate
D. All of the options given

11. Amount of entrapped air to be considered in the mix design of concrete is a function of
    A. Target compressive strength
    B. w-c ratio
    C. Nominal maximum aggregate size
    D. Grade of cement

12. In beam fatigue experiment, controlled stress test should be done for
    A. Thin pavements
    B. Thick pavements
    C. Locations with heavy traffic
    D. Either A or B

13. Which ingredient of cement is responsible for later strength
    A. C_3S
    B. $Ca(OH)_2$
    C. C_2S
    D. None of the options given

14. The durability of the bituminous mixture can be increased by
    A. Reducing the bitumen content
    B. Increasing the volume of aggregates
    C. Increasing the bitumen film thickness
    D. Lowering in-place compaction

15. The number of spheres to be used in Los Angeles Abrasion test depends on
    A. Aggregate size
    B. Aggregate gradation
    C. Weight of the charge
    D. Number of revolutions

16. Which of the following reasons usually lead to error in the measurement of specific gravity of aggregates
    A. Moisture conditioning of aggregates
    B. Measuring weight in water
    C. Saturated surface drying of aggregates
    D. Drying of aggregates

17. Pavement material properties through non-destructive testing are evaluated through
    A. Cutting pits and laboratory testing
    B. Visual observation of pavement distresses
    C. Back calculation using deflection data
    D. Using a dynamic cone penetrometer

18. Which of the following statement is true
    A. Silt and clay are highly plastic soils
    B. Silt has some cohesion and has modest plasticity
    C. In comparison to silt, clay particles are more spherical
    D. Clay has smaller specific surface area than silt

19. Which of the following statement is true
    A. The value of C_u of poorly graded soil will be greater than well graded soil
    B. The value of C_u of poorly graded soil will be smaller than well graded soil
    C. The value of C_u of poorly graded soil will be similar to well graded soil
    D. The value of C_u of poorly graded soil can be lower as well higher than well graded soil. It depends on the gradation

20. The soil parameter used as an input in the design of flexible pavement as per IRC 37 2018 is
    A. Modulus of subgrade reaction
    B. Plasticity index
    C. Shear strength
    D. California bearing ratio

21. Which of the following technology reduces the production temperature of asphalt mixtures

A. Polymers
B. Wax
C. Fibres
D. Nano-silica

22. Fly-ash reacts with which hydration product for formation of cementitious gel
    A. $Ca(OH)_2$
    B. $3CaO \cdot SiO_2$
    C. $2CaO \cdot SiO_2$
    D. $3CaO \cdot Al_2O_3$
23. Which of the following projects are exempted from EIA process in India?
    A. Road infrastructure projects greater than 150 kilometres
    B. Reservoir projects
    C. Airport projects
    D. Border Infrastructure projects

24. No. Of SDGs (Sustainable Development Goals) set by U.N. (United Nations) are?
    A. 11
    B. 15
    C. 17
    D. None of them

25. The effective depth of a shallow beam is the distance between
    A. Maximum compression and tension fibres
    B. Neutral axis and maximum compression fibre
    C. Neutral axis and maximum tension fibre
    D. Maximum compression fibre and the centroid of the tension reinforcement

26. The minimum pitch *i.e.*, the distance between centers of rivet holes is not less than
    A. 1.5 times the hole diameter
    B. 2.0 times the hole diameter
    C. 2.5 times the hole diameter
    D. 3.0 times the hole diameter

27. The flat slab is a reinforced concrete slab with or without drops and is supported
    A. On columns without column head
    B. On columns with column head
    C. On beams
    D. None of these

28. If f_{ck} is the characteristic cube strength of concrete in N/mm^2, the modulus of elasticity of structural concrete $E_c = a\sqrt{f_{ck}}$ where the value of a, is
    A. 5900
    B. 5800
    C. 5700
    D. 5600

29. For the reinforced concrete member totally immersed in sea water, the normal cover provided for the reinforcing bars is further increased by
    A. 10 mm
    B. 30 mm
    C. 20 mm
    D. 40 mm

30. In compression members, the lap length of a bar should not be less than
    A. 12 φ
    B. 16 φ
    C. 20 φ
    D. 24 φ

31. Which structure will perform better during earthquake?
    A. Statically determinate and indeterminate
    B. Depends upon magnitude of earthquake
    C. Statically indeterminate
    D. Statically determinate

32. The correct 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 > COD > TOD
D. COD > BOD > TOD

33. The suitable method for disinfection of swimming pool water is

A. Ultra violet rays treatment
B. Lime treatment
C. By using potassium permanganate
D. Chlorination

34. Ground water is usually free from

A. Suspended impurities
B. Dissolved impurities
C. Both suspended and dissolved impurities
D. None of the options given

35. Hardy cross method of analysis of distribution system

(i) Involves successive trials
(ii) Takes economic aspects into account
(iii) Is time consuming

The correct answer is

A. Only (i)
B. (i) and (ii)
C. (i) and (iii)
D. All are correct

Mechanical Engineering

Part – B **[35x1=35]**

1. Which of the following is the basic law for mechanics?
   A. Newton's law of viscosity
   B. Parallelogram law
   C. Newton's laws of motion
   D. Hooke's law

2. Which of the following is a feature of friction?
   A. Always acts in the direction opposite to the applied force
   B. Not a self-adjusting force
   C. Always acts in the direction of applied force
   D. It is an active force

3. Which of the following type of screws is used in the machines?
   A. Round-threaded
   B. Helical-threaded
   C. Rectangle-threaded
   D. Square-threaded

4.The change in the moment is equal to
   A. Rotational moment
   B. Area under the shear diagram
   C. Total weight
   D. Bending moment

5. In which of the forces do not cause the rotation?
   A. Non-Parallel
   B. Non-concurrent
   C. Parallel
   D. Concurrent

6.When there is no relative force between touching surfaces, which of the following force is developed?
   A. Dry friction
   B. Dynamic friction
   C. Static friction
   D. Fluid friction

7.Which of the following is a dominance of power screw?

   A. Large load carrying capacity
   B. High efficiency
   C. Wear of screw is reduced
   D. Mechanical advantage is lowered

8.Which hardness test uses the steel ball as indenter?

A. Rockwell C hardness test
B. Brinell Hardness test
C. Rockwell B hardness test
D. Vickers hardness test

9. Which metal from the following has the non-crystalline structure?

A. Quartz
B. Silica Glass
C. Tungsten
D. Iron

10. Which of the following has less crystallinity?

A. Nickel
B. Iron
C. Low-density polythene
D. High-density polythene

11. ASTM stands for?

A. American Society for Testing and Materials
B. American Society for Tool Measurement
C. American Society of Testing of Materials
D. American Society for Tensile Measurement

12. What is the first step involved in the process of preparing test samples for micro structural examination?

A. Fine grinding
B. Rough polishing
C. Etching
D. Fine polishing

13. What is the Iron-Carbon phase diagram?

A. Unary phase diagram
B. Binary phase diagram
C. Tertiary phase diagram
D. Ternary phase diagram

14.In which test, the specimen will be used in the form of the supported beam?

A. Charpy Test
B. Brinell Test
C. Izod test

D. Rockwell hardness test

15. Which of the following is the SI unit of force?
A. Kg m
B. Kg m^2
C. Kg m^2/s
D. Kg m/s^2

16.The enthalpy and internal energy are the function of temperature for
A. all gases
B. steam
C. water
D. ideal gas

17.Which of the following elements transfers torque and is only subjected with the bending moment?

A. Brake
B. Clutch
C. Axle
D. Belt drive

18.Which of the following joins two rotating shafts to each other?

A. Key
B. Coupling
C. Gear
D. Belt drive

19.Which of the following is not a type of transmission shaft?

A. Crankshaft
B. Countershaft
C. Transmission shaft
D. Line shaft

20.Which of these were or are used in automobiles to provide suspension.
A. Coil springs
B. Torsion bars
C. Leaf springs
D. All of the above

21.What is the function of the alternator?
A. Recharging the Battery
B. Voltage Regulator
C. Auto-ignition
D. None of the above

22.Heat transfer takes place according to which of the following law?
A. Newton's second law of motion
B. First law of thermodynamics
C. Newton's law of cooling
D. Second law of thermodynamics

23.Which of the following is the rate of heat transfer unit?
A. Watt
B. Pascal
C. Joule
D. Newton

24.Which of the following is an example of steady-state heat transfer?
A. Electric bulb cools down by the surrounding atmosphere
B. Chilling effect of cold wind on a warm body
C. Boilers and turbines
D. Cooling of I.C engine

25. A person prefers to sit by a fire during the cold winter months. Which of the following heat transfer types gives him with the most heat?
A. Convection and radiation together
B. Radiation will provide quick warmth
C. If it is near the fire, convection sounds good
D. Conduction from the fire

26.On which of the following does convective heat transfer coefficient doesn't depend?
A. Orientation of solid surface
B. Time
C. Surface area
D. Space

27.On which of the following just in time manufacturing philosophy emphasizes?
A. man power
B. profit
C. inventory
D. manufacturing

28.Why designs are periodically modified?
A. to strive for zero-based rejection and waste
B. to make products easier and faster to manufacture
C. to improve product performance
D. all of the above

29.Which of the following forging operation is heading?
A. Embossing
B. Coining
C. Upsetting
D. piercing

30. Which of the following is the odd-one out?
   A. micro-grinding
   B. micro-turning
   C. micro-milling
   D. micro-EBM

31.In case of a shaper, the feeding of the job is done
   A. At the beginning of the cutting stroke
   B. At the end of the return stroke
   C. At the end of cutting stroke
   D. At the middle of cutting stroke

32.The ultrasonic machining is best suited for material that is
   A. Soft and ductile
   B. Soft and brittle
   C. Hard and brittle
   D. Hard and ductile

33.One of the most specifications of the lathe is
   A. Swing over tool post
   B. Swing over tool bed
   C. Bed length
   D. Distance between centre

34.The current range in case of EDM is
   A. 1 A – 100 A
   B. 1 A – 200 A
   C. 1 A – 250 A
   D. 1 A – 500 A

35.The spark gap in EDM process normally varies from
   A. 005 mm to 0.50 mm
   B. 05 mm to 0.005 mm.
   C. 01 mm to 0.001 mm.
   D. 001 mm to 0.1 mm

CSE

Part-B **[35x1=35]**

1. The Boolean expression (A + C) (AB' + AC) (A'C' + B') can be simplified to
   A. AB'
   B. AB + A'C
   C. A'B + BC
   D. AB + BC

2. Which of the following logic families is well suited for high-speed operation?
   A. TTL
   B. ECL
   C. MOS
   D. CMOS

3. Which of the following is not a storage class specifier in C?
   A. auto
   B. register
   C. static
   D. volatile

4. The feature in object-oriented programming that allows the same operation to be carried out differently, depending on the object, is:
   A. Inheritance
   B. Polymorphism
   C. Overfunctioning
   D. Overriding

5. Which is not a feature of OOP in general definitions?
   A. Efficient Code
   B. Code Reusability
   C. Modularity
   D. Duplicate/Redundant data

6. In Java, when we implement an interface method, it must be declared as:
   A. Private
   B. Protected
   C. Public
   D. Friend

7. Consider the following JAVA program

```
public class First {
public static int CBSE (int x) {
if (x < 100) x = CBSE (x + 10);
```

```
return (x – 1);
}
public static void main (String[] args){
system.out.print(First.CBSE(60));
}
}
```

What does this program print?

A. 59
B. 95
C. 69
D. 99

8. Virtual memory is
   A. an extremely large main memory
   B. an extremely large secondary memory
   C. an illusion of an extremely large memory
   D. a type of memory used in super computers

9. In Round Robin CPU scheduling, as the time quantum is increased, the average turn around time
   A. increases
   B. decreases
   C. remains constant
   D. varies irregularly

10. If there are 32 segments, each of size 1 kilo bytes, then the logical address should have
   A. 13 bits
   B. 14 bits
   C. 15 bits
   D. 16 bits

11. The depth of a complete binary tree with '*n*' nodes is (log is to the base two)
   A. log(n+1) – 1
   B. log(n)
   C. *log(n–1) + 1*
   D. log(n) + 1

12. Which of the following algorithms solves the all-pair shortest path problem?
   A. Dijkstra's algorithm
   B. Floyd's algorithm
   C. Prim's algorithm
   D. Warshall's algorithm

13. The postfix expression for the infix expression A + B * (C + D) / F + D * E is
   A. AB+CD+*F/D+E*
   B. AB CD+*F/+DE*+

C. A*B+CD/F*DE++
D. A+*BCD/F*DE++

14. _____ offers the ability to query the data and insert, alter, and delete tuples.
A. Transaction Control Language
B. Data Control Language
C. Data Definition Language
D. Data Manipulation Language

15. Assume a relation X (M, N, O, P, Q) that has the following functional dependencies: MNO → PQ and P → MN, the total number of super keys of X would be:
A. 12
B. 10
C. 7
D. 2

16. A transaction enters into its _____ state when it finishes the final statement.
A. Abort state
B. Partially committed state
C. Committed state
D. Active stat

17. The language that a Pushdown Automation accepts in which the stack stays limited to about 10 items is described best as:
A. Recursive
B. Deterministic Context Free
C. Regular
D. Context Free

18. The graphical representation of syntax is represented by _____.
A. finite diagram
B. ER diagram
C. syntax diagram
D. Data Flow Diagram

19. The Linker _____.
A. is similar to interpreter
B. uses source code as its input
C. is required to create a load module
D. is similar to compiler

20. In case we detect an error within a statement, then the type that is assigned to this statement is:

A. Type error
B. Error type
C. Type expression
D. Type constructor

21. The maximum reduce moves that a bottom-up parser can take for grammar without epsilon and the unit-production (of type A -> ϵ as well as A -> a) for parsing the strings with n tokens would be:
A. 2^n
B. 2n-1
C. n-1
D. n/2

22. The total number of bits that are present are in the "tag" that is filed in the cache are:
A. 5
B. 6
C. 7
D. 8

23. Assembler is a machine dependent, because of?
A. Argument list array (ALA)
B. Macro definition table (MDT)
C. Pseudo operation table (POT)
D. Mnemonics operation table (MOT)

24. Macro processor is an inbuilt function of -
A. Assembler
B. Loader
C. Linker
D. Editor

25. Forward reference table (FRT) is arranged like -
A. Stack
B. Queue
C. Linked list
D. Double linked list

26. The number of clock cycles necessary to complete 1 fetch cycle in 8085 is
A. 3 or 4
B. 4 or 5
C. 4 or 6
D. 6 or 7

27. In the Spiral model of software development, the primary determinant in selecting activities in each iteration is
    A. Iteration size
    B. Cost
    C. Adopted process such as Rational Unified Process or Extreme Programming
    D. Risk

28. An object does NOT provide this service:
    A. Deactivating & Activating Objects
    B. Files implementing the identified entities in the ERD
    C. Registering object implementation
    D. Security features

29. Which protocol uses UDP as transport protocol?
    A. SMTP
    B. telnet
    C. DNS
    D. HTTP

30. What is protocol data unit at Application Layer in internet stack?
    A. Segment
    B. Datagram
    C. Message
    D. Frame

31. How many networks can be allowed in Class C under IPV4?
    A. 2^{14}
    B. 2^{17}
    C. 2^{21}
    D. 2^{24}

32. An organization has a Class B Network and need to from subnet for 64 departments. What would be the appropriate Subnet Mask?
    A. 255.255.0.0
    B. 255.255.64.0
    C. 255.255.128.0
    D. 255.255.252.0

33. _____ is a technique that is used to approximate the halftones without the reduction of spatial resolution.
    A. Dithering

B. Error diffusion
C. Halftoning
D. Approximation

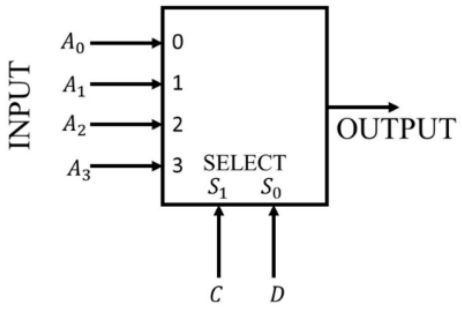
34. The three primary colors define which of these color models?
A. CMY and HSV
B. RGB and HSV
C. RGB and CMY
D. HSV and HLS

35. An object's color is determined largely by the diffuse reflection coefficient. Here, if Kd = (0.8, 0.4, 0), so if the light used is magenta and blue, then the color of the object would be:
A. Black and Red
B. Black and White
C. Red and Blue
D. White and Red

ECE

Part-B **[35x1=35]**

1. Consider the 2-bit multiplexer (MUX) shown in the figure. For OUTPUT to be the XOR of C and D, the values for A_0, A_1, A_2, and A_3 are:



A. $A_0 = 0, A_1 = 0, A_2 = 1, A_3 = 1$
B. $A_0 = 1, A_1 = 0, A_2 = 1, A_3 = 0$
C. $A_0 = 0, A_1 = 1, A_2 = 1, A_3 = 0$

D. $A_0 = 1, A_1 = 1, A_2 = 0, A_3 = 0$

2. Select the Boolean function equivalent to x + yz

A. x + z + xy
B. x + y + z
C. x + xy + yz
D. x + xz + xy

3.Select the correct statement regarding CMOS implementation of NOT gates.

A. Noise Margin High (NM_H) is always equal to the Noise Margin Low (NM_L), irrespective of the sizing of transistors.
B. Dynamic power consumption during switching is zero.
C. For a logical high input under steady state, the nMOSFET is in the linear regime of
D. The mobility of electrons never influences the switching speed of the NOT gate.

4. Consider a Boolean gate (D) where the output Y is related to the inputs A and B as, Y = $A + \bar{B}$, where + denotes logical OR operation. The Boolean inputs '0' and '1' are also available separately. Using instances of only D gates and inputs '0' and '1',

A. NAND logic can be implemented
B. OR logic cannot be implemented
C. NOR logic cannot be implemented
D. AND logic cannot be implemented

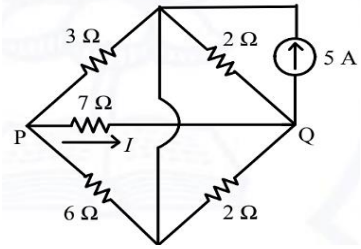
5. If $(1235)_x = (3033)_y$, where x and y indicate the bases of the corresponding numbers, then

A. x = 7 and y = 5
B. x = 8 and y = 6
C. x = 6 and y = 4
D. x = 9 and y = 7

6. Addressing of a 32K × 16 memory is realized using a single decoder. The minimum number of AND gates required for the decoder is

A. 2^8
B. 2^{32}
C. 2^{15}
D. 2^{19}

7. Consider the circuit shown in the figure. The current *I* flowing through the 7 Ω resistor between P and Q (rounded off to one decimal place) is _____ A.



A. 0.5
B. 0.12
C. 0.10
D. 1.0

8. The number of hardware interrupts (which require an external signal to interrupt) present in an 8085 microprocessor is:
A. 1
B. 5
C. 3
D. 13

9. An I/O processor controls the flow of information between
A. cache memory and I/O devices
B. main memory and I/O devices
C. two I/O devices
D. cache and main memories

10. In a microprocessor, when a CPU is interrupted, it
A. Stops execution of instructions.
B. Acknowledges interrupting and branches of subroutine.
C. Acknowledges interrupt and continues.
D. Acknowledges interrupt and waits for the next instruction from the interrupting device.

11. In a microcomputer, wait states are used to
A. make the processor wait during a DMA operation
B. make the processor wait during an interrupt processing
C. make the processor wait during a power shutdown
D. interface slow peripherals to the processor

12. A microprocessor with a 16-bit address bus is used in a linear memory selection configuration (i.e. Address bus lines are directly used as chip selects of memory chips) with 4 memory chips. The maximum addressable memory space is
A. 64K

B. 16K
C. 8K
D. 4K

13. Decimal 43 in Hexadecimal and BCD number systems are respectively
A. B2, 0100 0011
B. 2B, 0100 0011
C. 2B, 0011 0100
D. B2, 0100 0100

14. If a 4-bit 2's complement representation of a decimal number *x* is 1000, then the number
x is
A. 0
B. 8
C. -8
D. -7

15. The 2's complement representation of –17 is
A. 10001
B. 01110
C. 01111
D. 11110

16. An equivalent 2's complement representation of the 2's complement number 1101 is
A. 100011
B. 000011
C. 111001
D. 111101

17. A 2-bit binary multiplier can be implemented using
A. 2 input AND gates only.
B. 2 number of 2-input XOR gates and 6 number of 2-input AND gates.
C. Two 2-input NOR gates and one XNOR gate.
D. XOR gates and shift registers.

18. The number of comparators required in a 3-bit comparator type ADC is
A. 7
B. 2
C. 3
D. 8

19. The number of comparators in 4-bit flash ADC is
A. 5
B. 4
C. 16
D. 15

20. The resolution of a 4-bit counting ADC is 0.5 Volts. For an analogue input of 6.6 Volts,
the digital output of the ADC will be:
A. 1101
B. 1001
C. 1110
D. 1110

21. The advantage of using a dual slope ADC in a digital voltmeter is that
A. its conversion time is small
B. its accuracy is high
C. it gives output in BCD format
D. it does not require a comparator.

22. The Fourier transform of a conjugate symmetric function is always
A. imaginary
B. conjugate anti-symmetric
C. real
D. conjugate symmetric

23. If a signal *f(t)* has energy E, the energy of the signal *f(2t)* is equal to
A. E
B. E/2
C. 2E
D. 4E

24. The amplitude spectrum of a Gaussian pulse is
A. uniform
B. a sine function
C. Gaussian
D. an impulse function

25. A band-limited signal is sampled at the Nyquist rate. The signal can be recovered by passing the samples through
A. an RC filter
B. an envelope detector
C. a PLL
D. an ideal low-pass filter with the appropriate bandwidth

26. Flat-top sampling of low-pass signals
A. gives rise to aperture effects
B. implies over sampling
C. leads to aliasing

D. introduces delay distortion

27. If the emitter resistance in a common-emitter voltage amplifier is not bypassed, it will
A. reduce both the voltage gain and the input impedance
B. reduce the voltage gain and increase the input impedance
C. increase the voltage gain and reduce the input impedance
D. increase both the voltage gain and the input impedance

28. The cascode amplifier is a multistage configuration of
A. CC-CB
B. CE-CB
C. CB-CC
D. CE-CC

29. A BJT is said to be operating in the saturation region if
A. both the junctions are reverse biased
B. base-emitter junction is reverse biased and base-collector junction is forward biased.
C. base-emitter junction is forward biased and base-collector junction reverse biased
D. both the junctions are forward biased

30. The directivity of an antenna array can be increased by adding more antenna elements, as
a larger number of elements
A. Improves the radiation efficiency
B. Increases the effective area of the antenna
C. Results in a better impedance matching
D. Allows more power to be transmitted by the antenna

31. The refractive index of glass is 1.5. Find the wavelength of a beam of light with a frequency of 10^{14} Hz in glass. Assume velocity of light is 3×10^{8} m/s in vacuum.
A. 1µm
B. 2 µm
C. 3 µm
D. 3 mm

32. If the diameter of a $\lambda/2$ dipole antenna is increased from $\lambda/100$ to $\lambda/50$ then is
A. bandwidth increases
B. bandwidth decreases
C. gain increases
D. gain decreases

33. Which one of the following statements about differential pulse code modulation (DPCM)
is true?

A. The sum of message signal sample with its prediction is quantized
B. The message signal sample is directly quantized, and its prediction is not used
C. The difference of a message signal sample and a random signal is quantized
D. The difference of message signal sample with its predictions is quantized

34. In a PCM system, if the code word length is increased from 6 to 8 bits, the signal to quantization noise ratio improves by the factor

A. 6
B. 12
C. 16
D. 8

35. For a bit-rate of 8 kbps, the best possible values of the transmitted frequencies in a coherent binary FSK system are

A. 16 KHz and 20 KHz
B. 20 KHz and 32 KHz
C. 20 KHz and 40 KHz
D. 32 KHz and 40 KHz