

Sl. No. :

69014445

ECE08

Register  
Number

2014

**ELECTRONICS AND COMMUNICATION ENGINEERING  
(Degree Standard)**

Time Allowed : 3 Hours]

[Maximum Marks : 300

Read the following instructions carefully before you begin to answer the questions.

**IMPORTANT INSTRUCTIONS**

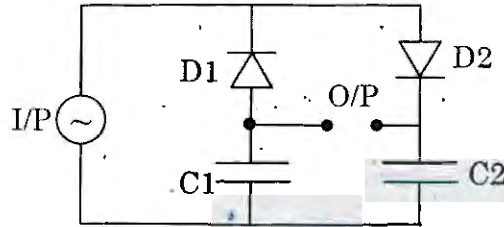
1. This Booklet has a cover (this page) which should not be opened till the invigilator gives signal to open it at the commencement of the examination. As soon as the signal is received you should tear the right side of the booklet cover carefully to open the booklet. Then proceed to answer the questions.
2. This Question Booklet contains 200 questions. Prior to attempting to answer the candidates are requested to check whether all the questions are there and ensure there are no blank pages in the question booklet. In case any defect in the Question Paper is noticed it shall be reported to the Invigilator within first 10 minutes.
3. Answer **all** questions. All questions carry equal marks.
4. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
5. You will also encode your Register Number, Subject Code, Question Booklet Sl. No. etc. with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, your Answer Sheet will not be evaluated.
6. Each question comprises *four* responses (A), (B), (C) and (D). You are to select **ONLY ONE** correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
7. In the Answer Sheet there are **four** circles (A), (B), (C) and (D) against each question. To answer the questions you are to mark with Ball point pen **ONLY ONE** circle of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. *e.g.* If for any item, (B) is the correct answer, you have to mark as follows :  

(A) ● (C) (D)
8. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
9. The sheet before the last page of the Question Booklet can be used for Rough Work.
10. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.
11. Do not tick-mark or mark the answers in the Question booklet.



1. Under steady state, thermal runaway in a CE amplifier is avoided if
- (A)  $\frac{\partial P_C}{\partial T_C} = \frac{1}{\theta}$     ~~(B)  $\frac{\partial P_C}{\partial T_C} < \frac{1}{\theta}$~~     (C)  $\frac{\partial P_C}{\partial T_C} > \frac{1}{\theta}$     (D)  $\frac{\partial P_C}{\partial T_C} = \theta$

2. The circuit shown in the figure is best described as a



- (A) Bridge rectifier    ~~(B) Voltage doubler~~    (C) Ring modulator    (D) Clamper
3. The oscillator circuit
- (A) Cannot be operated in class A condition
- ~~(B) Can be operated in class A condition to give sinusoidal waveform~~
- (C) Can be operated in class A condition to give distorted waveform
- (D) Can be operated in class A condition for better wave shape
4. The noise in a negative feedback amplifier
- (A) Increases
- ~~(B) Decreases~~
- (C) First increases and then decreases
- (D) First decreases and then increases
5. An oscillator uses
- ~~(A) Positive feedback~~
- (B) Negative feedback
- (C) Combination of positive negative feedback
- (D) No feedback
6. The term selectivity is given by
- ~~(A)  $\frac{1}{(1 + A\beta)}$~~     (B)  $(1 + A\beta)$     (C)  $\frac{1}{(1 - A\beta)}$     (D)  $A\beta$
7. The primary function of a phase inverter is to change the phase of a signal by
- (A)  $90^\circ$     (B)  $120^\circ$     (C)  $360^\circ$     ~~(D)  $180^\circ$~~
8. A Darlington transistor has a  $\beta$  of 8000. If  $R_E = 1\text{ k}\Omega$  and  $R_L = 100\ \Omega$ , the input impedance of the base is closest to
- (A)  $8\text{ k}\Omega$     (B)  $80\text{ k}\Omega$     ~~(C)  $800\text{ k}\Omega$~~     (D)  $8000\text{ k}\Omega$

9. A bleeder resistor is used in a d.c power supply because it  
 (A) Keeps the supply OFF (B) Keeps the supply ON  
 (C) Improves filtering action ~~(D) Improves voltage regulation~~
10. The ripple factor of a inductor filter is  
 (A)  $\frac{R_L w}{\sqrt{2}\sqrt{3L}}$  (B)  $\frac{R_L}{\sqrt{2}\sqrt{3L}}$  ~~(C)  $\frac{R_L}{3\sqrt{2}wL}$~~  (D)  $\frac{R_L}{\sqrt{3}2wL}$
11. Which of the following circuits cannot be operated directly from the mains?  
 (A) Half wave rectifier (B) Full wave rectifier  
 (C) Voltage doubler ~~(D) Center tapped full wave rectifier~~
12. The ripple factor of a half wave rectifier is  
~~(A) 1.21~~ (B) 0.482 (C) 0.406 (D) 0.121
13. In the transistor clipping circuit, the transistor is operated in its  
 (A) Break down region  
~~(B) Either in cut-off or in saturation or in both regions~~  
 (C) Along the load line  
 (D) Active region
14. At the break point of a clipping circuit, a diode behaves as  
~~(A) Short circuit and open circuit simultaneously~~  
 (B) Short circuit  
 (C) Open circuit  
 (D) It is difficult to decide
15. For Schmitt trigger, the upper and lower trip voltages are 3 V and 1 V, and higher and lower states are 15 V and 2 V. The output for a sinusoidal input of 10 V peak will be between  
~~(A) 2 V and 15 V~~ (B) 1 V and 3 V (C) 1 V and 15 V (D) 10 V and 15 V
16. A monostable multivibrator has  $R = 10 \text{ k}\Omega$  and  $C = 1 \text{ pF}$ ? What is the width of the pulse?  
 (A) 6.3 ps ~~(B) 6.3 ns~~ (C) 6.3  $\mu\text{s}$  (D) 6.3 ms
17. In the break region of clipping circuit, a diode behaves as  
 (A) fully on (B) it is difficult to decide  
 (C) fully off ~~(D) neither fully on nor fully off~~
18. In a diode clamping, when  $R_s = 0$ , the result is  
 (A) good impedance matching  
~~(B) the magnitude of discontinuity in input and output waveforms is same~~  
 (C) large source current into the clamping circuit  
 (D) no clamping operation

19. In Wein bridge oscillator, if the open loop gain of the Op-Amp is greater, then \_\_\_\_\_ is the frequency stability of the oscillator.

- (A) Greater (B) Lesser (C) Zero (D) Constant

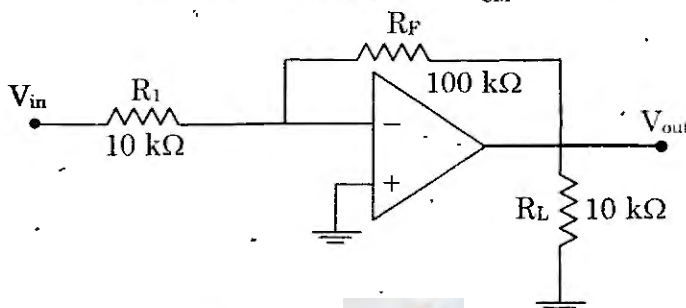
20. An ideal operational amplifier has

- (A) Infinite input resistance; zero o/p resistance, infinite bandwidth  
 (B) Finite input resistance; infinite o/p resistance, finite bandwidth  
 (C) Zero input resistance, infinite o/p resistance, infinite bandwidth  
 (D) Infinite input resistance, zero o/p resistance, finite bandwidth

21. The voltage that is to be applied between the two input terminals for making zero output voltage is

- (A) Output offset voltage (B) Threshold voltage  
 (C) Input offset voltage (D) None of the above

22. For the circuit shown in fig, what is the CMRR if  $A_{CM} = 0.001$



- (A) 10 (B) 0.001 (C) 10,000 (D) 1000

23. The main reason that PLL has been widely used as an integrated system component is

- (A) Less complex  
 (B) Easy to fabricate  
 (C) Feasibly of getting fabricated on a single chip for all individual components  
 (D) Require less time for fabrication

24. Fick's second law for diffusion process is

- (A)  $\frac{\partial N(x, t)}{\partial t} = D \cdot \frac{\partial^2 N(x, t)}{\partial x^2}$  (B)  $\frac{\partial N(x, t)}{\partial t} = D \cdot \frac{\partial N(x, t)}{\partial x}$   
 (C)  $\frac{\partial^2 N(x, t)}{\partial t^2} = D \cdot \frac{\partial N(x, t)}{\partial x}$  (D)  $\frac{\partial^2 N(x, t)}{\partial t^2} = D \cdot \frac{\partial^2 N(x, t)}{\partial x^2}$

25. Consider the following statements :

Assertion (A) : The output of the last flip flop in a shift register was connected back to the control input of the first flip flop in the register is called direct feedback.

Reason (R) : This technique is also referred to as inverse feedback.

Choose your answer as per the coding scheme.

- (A) Both (A) and (R) are false (B) Both (A) and (R) are true  
 (C) (A) is true but (R) is false (D) (A) is false but (R) is true

26. Which of the following logic family has lowest power consumption?  
 (A) ECL (B) DTL (C) CMOS (D) RTL
27. How many full adder(s) are required in a serial adder to perform 8-bit addition?  
 (A) Two (B) One (C) Three (D) Eight
28. The Boolean expression  $X = AB + CD$  represents  
 (A) Two ORs ANDed together (B) Two ANDs ORed together  
 (C) A 4-input AND gate (D) EX-OR gate
29. The modulus of a counter is  
 (A) The number of flip-flops  
 (B) The actual number of states in its sequence  
 (C) The number of times it recycles in a second  
 (D) The maximum possible number of states
30. If  $B_7$  and  $B_6$  bits of mode register in 8237 are set to 11, which mode of operation is selected?  
 (A) Cascade mode (B) Single mode  
 (C) Block mode (D) Demand mode
31. Which signal in 8085 is used to demultiplex address and data bus?  
 (A) READY (B) ALE (C) HOLD (D) HLDA
32. What is the maximum number of I/O devices can be interfaced with 8085 using I/O mapping of I/O device technique?  
 (A) 8 (B) 16 (C) 128 (D) 256
33. The maximum input clock frequency to 8253 is  
 (A) 3 MHz (B) 3.125 MHz (C) 2.6 MHz (D) 2.75 MHz
34. What is the maximum internal clock frequency of 8086 microprocessor?  
 (A) 3 MHz (B) 16 MHz (C) 5 MHz (D) 8 MHz
35. What is the capacity of internal RAM in 8051 microcontroller?  
 (A) 128 bytes (B) 256 bytes (C) 4 KB (D) 8 KB
36. In 8053/8054 timer, how many independent counters are available?  
 (A) 2 (B) 3 (C) 4 (D) 5
37. What is the maximum number of key codes that can be generated by 8279?  
 (A) 64 (B) 256 (C) 128 (D) 16

38. Consider the following pascal program fragment :

```
Var i, j : integer
Procedure Y (p, q : integer);
Began p : q - q;
p : p + q
p : q - p
end
i := 2;
j := 3;
Y (i, j);
```

If both parameters to Y are passed by reference, what are the values of i and j at the end of the program fragment?

- (A) i = 0, j = 2      (B) i = 1, j = 5      (C) i = 2, j = 3      ~~(D) i = 3, j = 2~~

39. Which of the following has a major role in implementation of function calls in C?

- (A) Processor's registers      (B) Data Segment  
~~(C) System stack~~      (D) The heap

40. The user microprogramming feature enables the designer to

- (A) design the microprogrammed controller  
~~(B) write his own microcode~~  
(C) redefine the microprogram stored in the control ROM  
(D) none of the above statement is true

41. Comparing the time T1 taken for a single instruction on a pipelined CPU with time T2 taken on a non-pipelined but identical CPU we can say that

- ~~(A) T1 = T2~~  
(B) T1 > T2  
(C) T1 < T2  
(D) T1 = T2 + time taken for one instruction fetch cycle

42. What is the correct sequence of time delays that happen during a data transfer from a disk to memory?

- (A) Seek time, access time, transfer time  
(B) Seek time, latency time, transfer time  
(C) Latency time, seek time, transfer time  
~~(D) Latency time, access time, transfer time~~

43. Digital multimeter display is generally \_\_\_\_\_ digits.

- ~~(A) 3½~~      (B) 2⅓      (C) 1⅓      (D) 1½

44. Generation of an emf due to motion of a coil in a magnetic field

- (A) Thermocouple      (B) Piezo electric transducer  
(C) Photo voltaic cell      ~~(D) Moving coil generator~~

45. In  $\pi$  mode of operation of magnetron, the angular velocity of spokes equal to  
 (A) sum of all anode poles/cycles (B) two anode poles/cycle  
 (C) difference between 2 anode poles/cycle (D) difference of all anode poles/cycle
46. Microwave 4 port circulator can be constructed using  
 (A) Magic tee and directional coupler (B) Magic tee and isolator  
 (C) Magic tee and attenuator (D) Magic tee and phase shifter
47. A typical n-type GaAs GUNN diode has the following parameters threshold field  $E_{th} = 2800$  V/cm applied field  $E = 3200$  V/cm, device length  $L = 10 \mu\text{m}$  doping concentration  $n_0 = 2 \times 10^{14} \text{ cm}^{-3}$ , operating frequency is  $f = 10$  GHz. Find the electron drift velocity  
 (A)  $10^3$  cm/sec (B)  $10^7$  cm/sec (C)  $10^{15}$  cm/sec (D)  $10^{18}$  cm/sec
48. A parametric amplifier has input and output frequency of 2.25 GHz and is pumped at 4.75 GHz. It is a  
 (A) Degenerate amplifier (B) Travelling wave amplifier  
 (C) Lower side band up-converter (D) Upper side band up converter
49. A backward wave oscillator is based on the  
 (A) Rising sun magnetron (B) Crossed field amplifier  
 (C) Coaxial magnetron (D) Traveling wave tube
50. At what condition the transmission line is called flat line?  
 (A) Standing wave ratio is unity (B) Standing wave ratio is zero  
 (C) Standing wave ratio is  $> 1$  (D) Standing wave ratio is  $< 1$
51. In an attenuator the rectangular to circular waveguide transition is used to convert  $TE_{10}$  mode into  
 (A)  $TE_{11}$  (B)  $TE_{01}$  (C)  $TM_{10}$  (D)  $TM_{11}$
52. A matched load is a single port device having ideal parameters  $Z_{in} = Z_0 = 50 \Omega$ . What is load location in the smith chart?  
 (A) Center of the smith chart (B) Outside the smith chart  
 (C) Inside the smith chart (D) None of the above
53. A GUNN diode  
 (A) Does not have a junction (B) Can rectify  
 (C) Can be used as a CW oscillator (D) Has negative resistance characteristics

54. A 400 W carrier is VSB modulated to a depth of 100%. Calculate the total power if 20% of the other sideband is transmitted along with wanted sideband  
 (A)  $120 \times 10^6$  W (B)  $120 \times 10^3$  W  (C) 120 W (D) 12 W
55. A transmission – line impairment is located 3000 m from the source. For a velocity of propagation of  $0.9c$ , the time elapsed from the beginning of the pulse to reception of the echo is  
 (A)  $20.5 \mu s$  (B)  $22.22 m s$   (C)  $22.22 \mu s$  (D)  $25.75 \mu s$
56. The characteristic impedance of the free space is  
 (A)  $\mu_0 / \epsilon_0 \Omega$   (B)  $377 \Omega$  (C)  $120 \pi \times Z_L \Omega$  (D)  $377 H^2 \Omega$
57. A parabolic antenna having a circular mouth is to have a power gain of 600 at  $\lambda = 10 cm$ . What is its half power beam width?  
 (A) 60  (B) 70 (C) 10 (D) 6
58. The relative permittivity of ionosphere at radio frequencies is  
 (A) = 0  (B) < 1 (C) > 1 (D) = 1
59. A high frequency radio link has to be established between two points on the earth 200 Km away. The reflection region of the ionosphere is at a height of 200 Km and has a critical frequency of 6 MHz. What is the MUF for the given path?  
 (A) 1.25 MHz  (B) 6.7 MHz (C) 2 MHz (D) 13.4 MHz
60. What is the cut off frequency for the dominant mode in rectangular waveguide of dimensions  $4 cm \times 2 cm$ ?  
 (A) 7 GHz  (B) 3.75 GHz (C) 375 GHz (D) 2 GHz
61. If the electric field strength of a plane wave is 1 V/m, what is the strength of a magnetic field "H" in free space?  
 (A)  $2.6 m A$  (B)  $2.6 \mu A$  (C)  $26 m A$  (D)  $26 \mu A$
62. What is the radiation resistance of an antenna which is drawing 10 amps current and radiating 5 KW?  
 (A)  $75 \Omega$   (B)  $50 \Omega$  (C)  $377 \Omega$  (D)  $60 \Omega$
63. What is the directivity of the isotropic antenna?  
 (A) 1 (B) 2 (C) 3 (D) 4
64. An isotropic antenna radiating 100 W of power, the power density at 2000 m from the source is  
 (A)  $7.96 \mu W / m^2$  (B)  $1.99 m W / m^2$  (C)  $2.99 \mu W / m^2$   (D)  $1.99 \mu W / m^2$



65. The continuous time unit impulse is defined as  
~~(A)~~  $\delta(t) = \frac{d}{dt}u(t)$  (B)  $\delta(t) = \int u(t) dt$  (C)  $\delta(t) = \frac{d}{dt}r(t)$  (D)  $\delta(t) = \int r(t) dt$
66. Let function  $A = \sin \omega_0 t$  and  $B = \sin(\omega_0 + \phi)$ . The power of two signals;  $P_A$  and  $P_B$  is related as  
 (A)  $P_B = \phi P_A$  (B)  $P_B = \frac{1}{\phi} P_A$  (C)  $P_B = \tan \phi P_A$  ~~(D)~~  $P_B = P_A = P$
67. The impedance parameters of a two port network are  $z_{11} = 6 \Omega$ ,  $z_{22} = 4 \Omega$ ,  $z_{12} = z_{21} = 3 \Omega$ . What are the equivalent  $ABCD$  parameters?  
 (A)  $A = 5, B = 5, C = 1/3, D = 4/3$  (B)  $A = 1, B = 5, C = 1/3, D = 4/3$   
~~(C)~~  $A = 2, B = 5, C = 1/3, D = 4/3$  (D)  $A = 2, B = 3, C = 5, D = 1$
68. What is the convolution of two signals?  $x_1(n) = \{1, -1, 2\}$  and  $x_2(n) = \{1, -2, 3\}$   
 (A)  $\{1, -3, 7, -7, 6\}$  ~~(B)~~  $\{1, -3, 7, -7, 6\}$   
 (C)  $\{1, -3, 7, 7, 6\}$  (D)  $\{1, 3, 7, -7, 6\}$
69. What is the power of the signal  $x(t) = 10 \sin\left(50t + \frac{\pi}{4}\right) + 16 \cos\left(100t + \frac{\pi}{3}\right)$ ?  
 (A) 10 watts (B) 256 watts (C) 100 watts ~~(D)~~ 178 watts
70. The impedance of 3 - element Yagi receiving antenna is around  
 (A) 75 ohms ~~(B)~~ 300 ohms (C) 50 ohms (D) 750 ohms
71. The function of chroma section in the TV receiver tube is to  
 (A) Combine electron beam (B) Separate electron beam  
 (C) Combine colors ~~(D)~~ Separate colours
72. In television pictures an effective rate of \_\_\_\_\_ vertical scans per second is utilized to reduce flicker.  
 (A) 500 (B) 5 ~~(C)~~ 50 (D) 5000
73. In TV, if the picture is very slow to appear and the picture tube may be gassy (its cathode emission very low)  
 (A) No brightness ~~(B)~~ Low brightness  
 (C) Excessive brightness (D) Average brightness
74. Video Bandwidth is  
~~(A)~~  $R_h / 2t$  (B)  $R_h \times 2t$  (C)  $2t / R_h$  (D)  $2R_h / t$

75. In radar propagation, above 100 MHz, the ionospheric attenuation seldom exceeds  
 (A) 1 dB                      (B) 2 dB                      (C) 5 dB                      (D) 7 dB
76. In radar propagation, attenuation in the clear atmosphere is seldom a serious problem at frequencies below  
 (A) 30 GHz                       (B) 16 GHz                      (C) 16 MHz                      (D) 30 MHz
77. A radar pulse sent to the target returns after 20  $\mu$ sec. What is the distance of the target from the radar?  
 (A) 30 Km                       (B) 3 Km                      (C) 300 Km                      (D) 3000 Km
78. Tracking radar determines  
 (A) Range  
 (B) Azimuth angle  
 (C) Elevation angle  
 (D) Range, azimuth, elevation and Doppler shift
79. High range resolution is obtained with  
 (A) High attenuation                      (B) Low attenuation  
 (C) Short pulse                      (D) Large pulse
80. Consider the following statements :  
 Assertion (A) : An orbit in which the satellite moves in the same direction as the earth's rotation is called prograde orbit  
 Reason (R) : The inclination of a prograde orbit always lies between  $0^\circ$  and  $90^\circ$   
 Select your answer according the coding scheme  
 (A) Both (A) and (R) are false                      (B) (A) is false but (R) is true  
 (C) (A) is true, but (R) is false                       (D) Both (A) and (R) are true
81. Consider the following statements :  
 Assertion (A) : Transparent transponders process the uplink satellite signal in such a way that only their amplitude and the frequency is altered and the spectral shape of the signal are not affected  
 Reason (R) : Transparent transponders are also referred to as bent pipe transponders as they simply transmit the information back to the earth  
 (A) Both (A) and (R) are true                      (B) (A) is true but (R) is false  
 (C) (R) is true but (A) is false                      (D) Both (A) and (R) are false

82. Match List – I with List – II and select the correct answer as per the codes :

- | List – I |  | List – II |                  |
|----------|--|-----------|------------------|
| (a)      | The point farthest from earth  | 1.        | Retrograde orbit |
| (b)      | Direct orbit   | 2.        | Mean anomaly     |
| (c)      | The inclination of this orbit always lies between $90^\circ$ and $180^\circ$         | 3.        | Apogee           |
| (d)      | Average value of the angular position of the satellite with reference to the perigee | 4.        | Prograde orbit   |

- |     | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (A) | 2   | 3   | 4   | 1   |
| (B) | 3   | 4   | 1   | 2   |
| (C) | 3   | 2   | 1   | 4   |
| (D) | 1   | 2   | 3   | 4   |

83. Match List – I with List – II and select the correct answer as per the codes :

- | List – I |                            | List – II |   |
|----------|----------------------------|-----------|---|
| (a)      | Universal coordinated time | 1.        | 86, 636.55536 mean sidereal seconds       |
| (b)      | Sidereal time              | 2.        | Used for all civil time keeping purposes  |
| (c)      | 1 mean solar day           | 3.        | 86, 164.09054 mean solar second           |
| (d)      | 1 mean sidereal day        | 4.        | Time measured relative to the fixed stars |

- |     | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (A) | 1   | 2   | 3   | 4   |
| (B) | 2   | 3   | 4   | 1   |
| (C) | 2   | 4   | 1   | 3   |
| (D) | 3   | 1   | 2   | 4   |

84. Match List – I with List – II and select the correct answer as per the codes given below :

- | List – I  |    | List – II            |  |
|---|----|----------------------|--|
| (a) RF band is divided into small frequency bands | 1. | TDMA                 |  |
| (b) Store and forward system                      | 2. | FDMA                 |  |
| (c) Spread spectrum multiple access               | 3. | Navigation technique |  |
| (d) Dead reckoning                                | 4. | CDMA                 |  |

- |     | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (A) | 1   | 2   | 3   | 4   |
| (B) | 2   | 4   | 3   | 1   |
| (C) | 3   | 2   | 1   | 4   |
| (D) | 2   | 1   | 4   | 3   |

85. Consider the following statements :

Assertion (A) : A transponder is the series of interconnected units which forms a single communication channel between the receive and transmit antennas in a communication satellite.

Reason (R) : A transponder cannot handle one modulated carrier such as a TV signal.

Select your answer

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (A) Both (A) and (R) are false   | (B) (A) is true but (R) is false |
| (C) (A) is false but (R) is true | (D) Both (A) and (R) are true    |

86. A video signal of bandwidth 4.2 MHz is used to frequency modulate a carrier, the deviation ratio being 2.56. Its signal bandwidth is

- |              |                |
|--------------|----------------|
| (A) 4.2 MHz  | (B) 10.752 MHz |
| (C) 29.9 MHz | (D) 8.4 MHz    |

87. Consider the following statements :

Assertion (A) : Along with satellite wideband receiver, a duplicate receiver is provided, this combination is called redundant receiver.

Reason (R) : Although two are provided, both are used simultaneously at a given time.

Choose your answer

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (A) Both (A) and (R) are true    | (B) Both (A) and (R) are false   |
| (C) (A) is false but (R) is true | (D) (A) is true but (R) is false |

88. Consider the following statements :

Assertion (A) : The total number of maximal sequences that can be generated by an n-stage shift register is  $S_{max} = \phi(N) \cdot n$ .

Reason (R) :  $\phi(N)$  is known as Bessels function.

Choose your answer

- (A) (A) is true but (R) is false                      (B) (A) is false but (R) is true  
(C) Both (A) and (R) are false                      (D) Both (A) and (R) are true

89. Consider the following statements :

Assertion (A) : One of the most important properties of code signal  $C(t)$  is its auto correlation.

Reason (R) : The auto correlation is not a periodic sequence.

- (A) (A) is true but (R) is false                      (B) (A) is false but (R) is true  
(C) Both (A) and (R) are true                      (D) Both (A) and (R) are false

90. Consider the following statements :

Assertion (A) : The CATV system employs a single outdoor unit, which separates feeds available for each sense of polarization, like the MATV system.

Reason (R) : So that, all the channels are made available simultaneously at the indoor receiver in CATV systems .

Choose your answer

- (A) (A) is false but (R) is true                      (B) (A) is true but (R) is false  
(C) Both (A) and (R) true                      (D) Both (A) and (R) false

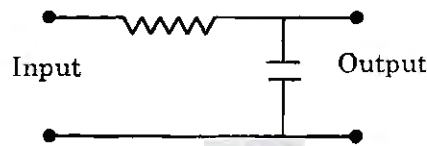
91. At 1300 nm, the quantum efficiency for InGaAs is 90%. The responsivity is equal to

- (A) 82 A/W                      (B) 85 A/W  
(C) 92 A/W                      (D) 97 A/W

92. Generally, the SM fiber will have a core diameter of
- (A) ~~10  $\mu m$~~  (B) 30  $\mu m$   
 (C) 50 – 100  $\mu m$  (D) 50 – 200  $\mu m$
93. The fiber splice is a \_\_\_\_\_ joint between 2 fibers.
- (A) Temporary (B) ~~Permanent~~  
 (C) Demountable (D) Alignment
94. When the mean optical power launched into an 8 Km length of fiber is 120  $\mu w$ . The mean optical power at the fiber output is 3  $\mu w$ . Find the signal attenuation
- (A)  $10 \log_{10} 25$  (B)  ~~$10 \log_{10} 40$~~   
 (C)  $20 \log_{10} 40$  (D)  $20 \log_{10} 25$
95. Which of the following use syndrome decoding?
- (A) ~~Block codes~~ (B) Line codes  
 (C) Convolutional codes (D) Cyclic codes
96. For a hamming distance of "6" how many errors can be corrected?
- (A) 3 errors (B) 6 errors (C) ~~2 errors~~ (D) 1 error
97. If a pulse carries more than one bit the pulse rate is
- (A) ~~Lower than bit rate~~ (B) Greater than bit rate  
 (C) Equal to bit rate (D) Equal to 1
98. For any positive integer  $m$  and  $t$ , the block length of Bose – Chaudri – Hocquenghem code is
- (A)  $2t + 1$  (B)  $n - t$  (C)  ~~$2^m - 1$~~  (D)  $2^m$
99. For the code  $X_1 = (000, 111)$  how many errors can be successfully detected?
- (A) ~~upto two~~ (B) upto three  
 (C) upto seven (D) upto four

100. In a 100 ns pulse,  $6 \times 10^6$  photons at a wavelength of 1300 nm fall on an InGaAs photo detector. On the average,  $5.4 \times 10^6$  electron - hole pairs are generated. The quantum efficiency is found to be
- (A) 75% (B) 80%  
 (C) 85% (D) 90%
101. What type of wiring does ISDN use?
- (A) Coaxial cable (B) Twisted pair  
 (C) Solenoid (D) Thin wire
102. The local loop is
- (A) An antenna used for telephone communications  
 (B) The connection between telephone subscriber and central office  
 (C) A cell site  
 (D) A ring network used to connect users to the telephone office
103. A message switching network is designed for 95% utilization of its transmission links. If  $\lambda = 10$  messages/min. Find the average waiting time
- (A) 1.058 min (B) 1.805 min  
 (C) 1.508 min (D) 1.068 min
104. Blocking probability of a 3 stage switch in term of inlet utilization  $P$
- (A)  $B = [1 - (1 - P/\beta)^2]^K$  (B)  $B = [(1 - P/\beta)^2]^K$   
 (C)  $B = [(1 - P/\beta)^2]$  (D)  $B = [(1 - P/\beta)^2 - 1]^K$
105. Telephone traffic is measured
- (A) with echo cancellers (B) by relative congestion  
 (C) in terms of the grade of service (D) in erlangs
106. Identical telephone numbers in different parts of country are distinguished by their
- (A) language digits (B) access digits  
 (C) area codes (D) central office codes

107. Which statement is not correct? The given circuit is



- (A) Low pass filter  
 (B) High pass filter  
 (C) De-emphasis circuit  
 (D) Integrator

108. At room temperature, a possible value for the mobility of electrons in the inversion layer of a silicon n-channel MOSFET is

- (A) 450 cm<sup>2</sup>/V-S  
 (B) 1350 cm<sup>2</sup>/V-S  
 (C) 1800 cm<sup>2</sup>/V-S  
 (D) 3600 cm<sup>2</sup>/V-S

109. The depletion capacitance  $C_j$ , of an abrupt P-N junction with constant doping on either side varies with reverse bias,  $V_R$ , as

- (A)  $C_j \propto V_R$   
 (B)  $C_j \propto 1/V_R$   
 (C)  $C_j \propto (1/V_R)^2$   
 (D)  $C_j \propto (1/V_R)^3$

110. The n-channel silicon ( $E_g = 1.1$  eV) MOSFET was fabricated using n+ poly-silicon gate and the threshold voltage was found to be 1 V. Now, if the gate is changed to P+ poly-silicon, other things remaining the same, the new threshold voltage should be

- (A) -0.1 V  
 (B) 0 V  
 (C) 1.0 V  
 (D) None of these

111. Typically silicon transistors are operated over temperature range extending from

- (A) -25°C to +175°C  
 (B) -65°C to +75°C  
 (C) -65°C to +175°C  
 (D) -25°C to +75°C

112. When L is doubled and C is halved, the frequency of oscillation is?

- (A) Doubled  
 (B) Halved  
 (C) One quarter  
 (D) Unchanged

113. What is the approximate breakdown current that burns out the diode, if it has a breakdown voltage of 150 V and maximum power dissipation of 0.5 W

- (A) 3.33 MA  
 (B) 3.33 mA  
 (C) 3.33 nA  
 (D) 3.33 A

114. If the value of  $h_{fe}$  increases, the

- (A) value of input impedance decreases and the value of current gain increases  
 (B) values of both the input impedance and the current gain decrease  
 (C) values of both the input impedance and the current gain increase  
 (D) value of input impedance increases and the value of current gain decreases

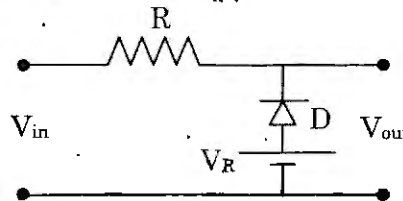


115. The voltage gain of an amplifier decreases at 20 dB/decade above 100 kHz. If the mid band frequency gain is 80 dB. What is the value of the voltage gain at 2 MHz?  
 (A) 60 dB (B) 52 dB (C) 54 dB ~~(D) 64 dB~~
116. While using a bipolar junction transistor as an amplifier, the collector and emitter terminals got interchanged mistakenly. Assuming that the amplifier is a common emitter amplifier and the biasing is suitably adjusted, the interchange of terminals will result into which one of the following?  
 (A) Infinite gain (B) Zero gain  
 (C) No change in gain at all ~~(D) Reduced gain~~
117. The common – mode voltage gain of a differential amplifier is equal to  $R_C$  divided by  
 (A)  $r'_e$  (B)  $r'_e/2$  (C)  $2r'_e$  ~~(D)  $2R_E$~~
118. An npn transistor has a unity-gain cutoff frequency  $f_T$  of 400 MHz at a dc bias current  $I_C = 10$  mA. The value of its  $C_\mu$  (in PF) is approximately ( $V_T = 26$  mV).  
 (A) 100 PF (B) 120 PF ~~(C) 150 PF~~ (D) 300 PF
119. Ripple factor of capacitor filter is  
~~(A)  $\frac{1}{4\sqrt{3}fCR_L}$~~  (B)  $\frac{1}{\sqrt{3}fCR_L}$  (C)  $\frac{1}{\sqrt{34}fCR_L}$  (D)  $\frac{\sqrt{3}}{4fCR_L}$
120. Maximum efficiency of Bridge rectifier is  
~~(A) 81.2%~~ (B) 8.12% (C) 40.6% (D) 4.06%
121. Perigee means  
~~(A) Smallest radius of the elliptical orbit~~  
 (B) Largest radius of the elliptical orbit  
 (C) Line of sight distance from a particular point on earth to satellite  
 (D) The distance of the satellite from the sub-satellite point
122. The D.C. component of inductor filter is  
~~(A)  $\frac{2V_m}{\pi}$~~  (B)  $\frac{V_m}{\pi}$  (C)  $\frac{V_m}{2\pi}$  (D)  $V_m$
123. Form factor of half wave rectifier is  
 (A)  $\pi$  (B)  $\pi/4$  ~~(C)  $\pi/2$~~  (D)  $2\pi$
124. In a centre tapped full wave rectifier, if  $V_m$  is the peak voltage between the centre tap and one end of the secondary the maximum voltage coming across the reverse biased diode is  
 (A)  $V_m$  ~~(B)  $2V_m$~~  (C)  $\frac{V_m}{2}$  (D)  $\frac{V_m}{\sqrt{2}}$

125. Which of the following is also called as Eccles Jordan circuit?
- (A) Astable Multivibrator (B) Monostable Multivibrator  
~~(C) Bistable Multivibrator~~ (D) Schmitt Trigger

126. Clamping circuit theorem is mathematically expressed in the standard notation as
- (A)  $\frac{A_f}{A_r} = \frac{R}{R_f}$  ~~(B)  $\frac{A_f}{A_r} = \frac{R_f}{R}$~~  (C)  $\frac{A_r}{A_f} = \frac{R_f}{R}$  (D)  $\frac{A_r}{A_f} = 1 + \frac{R_f}{R}$

127. A sinusoidal wave of amplitude  $V_m$  is applied as an input to the parallel diode clipping circuit shown in fig. What is its output voltage?



- ~~(A) Output is allowed in between  $V_R$  and  $+V_m$~~   
 (B) Output is allowed in between  $-V_R$  and  $+V_m$   
 (C) Output is allowed in between  $-V_R$  and  $-V_m$   
 (D) Output is allowed in between  $-V_m$  and  $V_R$
128. In a multi-diode circuit containing  $n$ -diodes, the following statement is not correct
- (A) The circuit has  $2^n - (n+1)$  suppressed states  
~~(B) The circuit has  $n$ -break points~~  
~~(C) The circuit has  $n$  realizable states~~  
 (D) The transfer characteristics has  $n+1$  straight line segments
129. The granular noise can be reduced by
- (A) Increasing the step size (B) Increasing input signal amplitude  
~~(C) Reducing the step size~~ (D) Reducing input signal amplitude
130. In PLL, the range of input frequency for which the initially unlocked loop will lock on an input signal is known as
- (A) Cutoff range (B) Lock range  
~~(C) Capture range~~ (D) Space range
131. Trans conductance amplifier is a
- ~~(A) Voltage to current converter~~ (B) Current to voltage converter  
 (C) Current controlled current source (D) Voltage controlled voltage source
132. An audio signal ranging from dc to 20 kHz could be reconstructed by taking uniformly spaced samples at a rate of
- ~~(A) 40,000 samples/second~~ (B) 20,000 samples/second  
 (C) 10,000 samples/second (D) 4,000 samples/second

133. How many flip flops are required to construct a mod-128 counter? What is the largest decimal number that can be stored in a mode-64 counter?

- (A) Seven flip flops, largest decimal number is 63
- (B) Five flip flops, largest decimal number is 63
- (C) Seven flip flops, largest decimal number is 15
- (D) Five flip flops, largest decimal number is 32

134. Implementation of Boolean function of  $n$  variables with a multiplexer that has  $n$  selection inputs for the total number of minterms of

- (A)  $2n$
- (B)  $4n$
- (C)  $n^2$
- (D)  $2^n$

135. Consider the following statements :

Assertion (A) : A decoder is similar to a demultiplexer, with one exception – there is an data input for the decoder.

Reason (R) : The inputs of the decoders are data input and control input.

Select your answer according to the coding scheme

- (A) (A) is false but (R) is true
- (B) Both (A) and (R) are true
- (C) (A) is true but (R) is false
- (D) Both (A) and (R) are false

136. Match the List-I with List-II as per the codes given below

List-I		List-II	
(a)	$Y = AB + CD$	1.	Not operation
(b)	$Y = (A + B)(C + D)$	2.	Sum of products equation
(c)	$\overline{A + B} = \overline{A} \overline{B}$	3.	Product of sums equation
(d)	$Y = \overline{A}$	4.	Demorgan's first theorem
(a)	(b)	(c)	(d)
(A)	1	2	3
(B)	4	2	3
(C)	2	3	4
(D)	3	1	2

137. Match the List-I with List-II, as per the codes given below

List-I		List-II (definitions)	
(a)	A digital circuit designed to keep track of a number of events	1.	Active low
(b)	A group of flip flops used to store a binary number	2.	Negation
(c)	A circuit that will invert a digital level	3.	Register
(d)	An action occurs when the input is low	4.	Counter
(a)	(b)	(c)	(d)
(A)	4	3	2
(B)	3	2	4
(C)	4	1	2
(D)	1	2	3

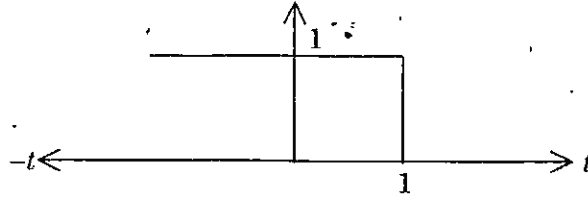
138. Which of the following is not 8-bit microprocessor?  
 (A) Intel 8085 (B) Motorola 6800  
~~(C) TI TMS 9900~~ (D) Zilog Z80
139. How many number of address lines are required to address 8 KB EPROM memory?  
 (A) 8 (B) 12 ~~(C) 13~~ (D) 16
140. What is the size of optical compact disk which is used for recording high quality music?  
 (A) 3.7 inch ~~(B) 4.7 inch~~ (C) 5.7 inch (D) 3.5 inch
141. Consider a disk with the following characteristics :  
 Track size : 10,000 bytes  
 Rotational latency : 10 ms/revolution  
 Block size : 1000 bytes  
 What is the maximum transfer rate per track measured in bits per second as is conventional for this disk unit?  
 (A) 4000 Mbps ~~(B) 8 Mbps~~ (C) 6400 Mbps (D) 4250 Mbps
142. Consider a 4-way set associative cache consisting of 128 lines with a line size of 64 words. The CPU generates a 20-bit address of a word in main memory. The number of bits in the TAG, LINE and WORD fields are respectively.  
 (A) 9, 6, 5 ~~(B) 7, 7, 6~~ (C) 7, 7, 5 (D) 9, 5, 6
143. Which of the following data structure is used by a compiler to manage information about variables and their attributes?  
 (A) Abstract syntax tree (B) Linked list  
 (C) Parse table ~~(D) Symbol table~~
144. List-I shows some operating system abstractions and List-II hardware components. Match List-I with List-II and select the correct answer from the codes given below the list.
- | List-I                   | List-II      |
|--------------------------|--------------|
| P. Thread                | 1. Interrupt |
| Q. Virtual address space | 2. Memory    |
| R. File system           | 3. CPU       |
| S. Signal                | 4. Disk      |
- (A) P-2; Q-4; R-3; S-1 (B) P-1; Q-2; R-3; S-4  
~~(C) P-3; Q-2; R-4; S-1~~ (D) P-4; Q-1; R-2; S-3

145. The degree to which the transmitter output power is reduced below its peak output is known as  
 (A) Reuse (B) Output back off (C) Offset (D) Framing
146. Precision is defined as  
 (A) Repeatability (B) Reliability (C) Uncertainty (D) Accuracy
147. The permeability of a magnetic material changes when it is subjected to a mechanical stress, it is called as  
 (A) Hall effect (B) Villari effect  
 (C) Piezo electric effect (D) Elastic effect
148. A thermometer at a room temperature of  $28^{\circ}\text{C}$  is suddenly immersed in a steaming water bath. Calculate the time constant of the thermometer, if it takes 30 sec to show a reading of  $96.4^{\circ}\text{C}$   
 (A)  $\tau = 10$  sec (B)  $\tau = 15$  sec (C)  $\tau = 5$  sec (D)  $\tau = 20$  sec
149. Consider a strain gauge of  $R_g = 350 \Omega$  and gauge factor of 2.82. Calculate equivalent strain if resistance of  $100 \text{ k}\Omega$  is shunted across the strain gauge  
 (A)  $1236 \times 10^{-6} \text{ cm/cm}$  (B)  $1236 \times 10^{-3} \text{ cm/cm}$   
 (C)  $1236 \times 10^{-13} \text{ cm/cm}$  (D)  $1236 \times 10^{-8} \text{ cm/cm}$
150. Consider a capacitor of area  $4 \text{ cm}^2$ ,  $0.02 \text{ cm}$  gap and permittivity of air is  $8.854 \times 10^{-12} \text{ F/m}$ . Calculate the capacitance.  
 (A)  $17.78 \mu\text{F}$  (B)  $17.78 \text{ pf}$  (C)  $17.78 \text{ nf}$  (D)  $17.78 \text{ mf}$
151. A I order instrument must measure signals with frequency content upto 200 Hz with an amplitude Inaccuracy of 2%. What is the maximum allowable time constant?  
 (A)  $\tau = 0.509 \times 10^{-3} \text{ sec}$  (B)  $\tau = 0.905 \times 10^{-3} \text{ sec}$   
 (C)  $\tau = 0.050 \times 10^{-3} \text{ sec}$  (D)  $\tau = 0.950 \times 10^{-3} \text{ sec}$
152. The difference between the measured value and the true value of the unknown quantity is known as the \_\_\_\_\_ of measurement.  
 (A) Limiting error (B) Absolute error  
 (C) Relative error (D) Percentage error
153. The cavity magnetron uses strapping to  
 (A) prevent mode jumping (B) prevent cathode back heating  
 (C) ensure bunching (D) improve the phase focusing effect

154. The pilot carrier in SSB is used for  
 (A) Providing better noise immunity  
 (B) Frequency Stability purpose  
 (C) Lower power consumption  
 (D) None of the above
155. Pre emphasis deals with  
 (A) Emphasizing low frequency components  
 (B) Emphasizing high frequency components  
 (C) Emphasizing a band of mid frequency components  
 (D) Eliminating a band of mid frequency components
156. Fourier analysis shows that a odd signal consists of  
 (A) Fundamental sine waves only  
 (B) Fundamental cosine waves only  
 (C) A Fundamental sine wave and infinite number of harmonics  
 (D) None of the above
157. A message signal made of multiple frequency components has a single tone sine wave of 400 Hz and sound of frequency components with lowest value of 800 Hz and highest value of 1600 Hz. What should be the minimum sampling frequency to sense the information present in this signal?  
 (A) 400 Hz (B) 800 Hz (C) 1600 Hz (D) 3200 Hz
158. Following is not the purpose of modulation  
 (A) Multiplexing  
 (B) Effective radiation  
 (C) Shifting the spectrum  
 (D) Increase in signal power
159. Which of the following modulation is digital in nature?  
 (A) PAM (B) PPM (C) PWM (D) PCM
160. The PAM signal can be detected by  
 (A) Band pass filter  
 (B) Band stop filter  
 (C) High pass filter  
 (D) Low pass filter
161. Flat top sampling leads to  
 (A) Aperture effect (B) Aliasing (C) Loss of signal (D) Gain of signal
162. Envelope detector is used in the detection of  
 (A) AM wave (B) DSBSC wave (C) SSB wave (D) FM wave
163. In a broadcast superheterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit at the input to the mixer is 100. If the intermediate frequency is 455 KHz, calculate the image frequency at 1000 KHz.  
 (A) 1100 KHz (B) 1200 KHz (C) 1455 KHz (D) 1910 KHz

164. The maximum usable frequency is \_\_\_\_\_ for the angle of incidence of  $\theta$
- (A) Critical frequency  $\times \sin \theta$  (B) Critical frequency  $\times \tan \theta$   
 (C) Critical frequency  $\times \cos \theta$  (D) Critical frequency  $\times \sec \theta$

165. Identify the signal represented by the figure?



- (A)  $u(t) - 1$  (B)  $-2u(t - 1)$  (C)  $u(t - 1)$  (D)  $u(-t + 1)$

166. The linear constant coefficient difference equation  $y(n) - \frac{1}{2}y(n-1) = x(n) + \frac{1}{3}x(n-1)$  lead to

- (A)  $\frac{Y(Z)}{X(Z)} = \frac{1 + \frac{1}{3}Z^{-1}}{1 + \frac{1}{2}Z^{-1}}$  (B)  $\frac{Y(Z)}{X(Z)} = \frac{1 - \frac{1}{3}Z^{-1}}{1 - \frac{1}{2}Z^{-1}}$   
 (C)  $\frac{Y(Z)}{X(Z)} = \frac{1 - \frac{1}{3}Z^{-1}}{1 + \frac{1}{2}Z^{-1}}$  (D)  $\frac{Y(Z)}{X(Z)} = \frac{1 + \frac{1}{3}Z^{-1}}{1 - \frac{1}{2}Z^{-1}}$

167. For the symmetrical T section

- (A)  $\sqrt{Z_1 Z_2 \left(1 + \frac{Z_1}{4Z_2}\right)}$  (B)  $\sqrt{\frac{Z_1 Z_2}{1 + Z_1 / 4Z_2}}$   
 (C)  $\sqrt{Z_1 Z_2 \left(1 - \frac{Z_1}{4Z_2}\right)}$  (D)  $\sqrt{\frac{Z_1 Z_2}{1 - \frac{Z_1}{4Z_2}}}$

168. If  $x_1(n) = (2, 1, 2, 1)$  and  $x_2(n) = (1, 2, 3, 4)$  then find  $x_3(n) = x_1(n) \odot x_2(n)$

- (A)  $x_3(n) = (14, 14, 16, 16)$  (B)  $x_3(n) = (16, 16, 14, 14)$   
 (C)  $x_3(n) = (14, 16, 14, 16)$  (D)  $x_3(n) = (16, 14, 16, 14)$

169. The system function of the digital filter is

- (A)  $H(Z) = \sum_{K=0}^N \frac{C_K}{1 - e^P K^T Z^{-1}}$  (B)  $H(Z) = \sum_{K=1}^N \frac{C_K}{1 - e^P K^T Z^{-1}}$   
 (C)  $H(Z) = \sum_{K=-N}^N \frac{C_K}{1 - e^P K^T Z^{-1}}$  (D)  $H(Z) = \sum_{K=0}^{\infty} \frac{C_K}{1 - e^P K^T Z^{-1}}$

170. In PAL-B, the luminance signal is  
 (A)  $Y = 0.59R + 0.30G + 0.11B$   
 (C)  $Y = 0.30R + 0.11G + 0.59B$   
~~(B)~~  $Y = 0.30R + 0.59G + 0.11B$   
~~(D)~~  $Y = 0.11R + 0.30G + 0.59B$
171. The three primary colours are  
 (A) Red, Yellow, Orange  
 (C) Red, Blue, Cyan  
~~(B)~~ Red, Blue, Yellow  
~~(D)~~ Red, Blue, Green
172. After the mixer stage in a transmitters the beat frequency of video signal and audio signal respectively is  
~~(A)~~ 38.9 MHz, 33.4 MHz  
 (C) 38.9 MHz for both  
 (B) 33.4 MHz, 38.9 MHz  
 (D) 33.4 MHz for both
173. The bandwidth of a channel in a TV system is  
 (A) 5 MHz  
 (B) 6 MHz  
~~(C)~~ 7 MHz  
 (D) 8 MHz
174. The horizontal sweep oscillator in a TV operates at  
 (A) 625 Hz  
 (B) 1250 Hz  
~~(C)~~ 15625 Hz  
 (D) 50 Hz
175. The maximum range of pulsed radar depends on  
~~(A)~~ Pulse peak power  
~~(C)~~ Pulse energy  
 (B) Pulse duration  
 (D) Pulse repetition rate
176. If the peak transmitted power in a radar system is increased by a factor of 16, the maximum range will be increased by a factor of  
~~(A)~~ 2  
 (B) 4  
 (C) 8  
 (D) 16
177. Receiver noise temperature is proportional to noise power spectral density through the relation  
 (A)  $T = N \cdot KB$   
~~(B)~~  $T = \frac{N}{KB}$   
 (C)  $T = \frac{NB}{K}$   
 (D)  $T = \frac{NK}{B}$
178. The definition of fluctuation loss is  
~~(A)~~  $L_{fe} = \frac{D_e(n_1, n_e)}{D_0(n)}$   
 (C)  $L_{fe} = \frac{D_e(n_e)}{D_0(n)}$   
 (B)  $L_{fe} = \frac{D_0(n_1, n_e)}{D_e(n)}$   
 (D)  $L_{fe} = \frac{D_0(n)}{D_e(n_e)}$
179. In CW radar, which tracking technique is used as a primary means of resolving targets?  
~~(A)~~ Doppler tracking  
 (C) Angle tracking  
 (B) Range tracking  
 (D) Line tracking



180. Consider the following statements :

Assertion (A) : In a spin - stabilized satellite, the satellite body is spun at a rate between 30 and 100 rpm about an axis perpendicular to the orbital plane

Reason (R) : To maintain stability, moment of inertia about the desired spin axis should at least 10% greater than the moment of inertia about the transverse axis

Select your answer

(A) Both (A) and (R) are false

(B) (A) is true but (R) is false

(C) Both (A) and (R) are true

(D) (A) is false but (R) is true

181. Consider the following statements :

Assertion (A) : With reference to satellites, an eclipse is said to occur when the sunlight fails to reach the satellites solar panel

Reason (R) : Due to an abstraction from a celestial body

(A) (A) is true but (R) is false

(B) Both (A) and (R) are false

(C) (A) is false but (R) is true

(D) Both (A) and (R) are true

182. The orbital parameters are eccentricity  $e = 0.0011501$  and radius  $a = 7192.335$  Km. The apogee and perigee heights for a mean earth (R) radius of 6371 Km is

(A) Apogee height = 829.6 Km

(B) Apogee height = 7000 Km

Perigee height = 813.1 Km

Perigee height = 813.1 Km

(C) Apogee height = 4000 Km

(D) Apogee height = 10040 Km

Perigee height = 2000 Km

Perigee height = 829.6 Km

183. A satellite is operated at an EIRP of 56 dBW with an output Back Off (BO) of 6 dB. The transmitter feeder losses amounts to 2 dB and the antenna gain is 50 dB. The power output of the TWTA (Travelling Wave Tube Amplifier) required for full saturated EIRP is

(A) 8 dBW

(B) 14 dBW

(C) 1 dBW

(D) 0 dBW

184. Match List – I with List – II and select the correct answer as per the codes :

List – I

List – II

- |  |                          |
|--|--------------------------|
| (a) The path followed by a satellite around the primary will be an ellipse               | 1. True Anomaly          |
| (b) The angle from the perigee to the satellite position, measured at the earth's centre | 2. Keplerian element set |
| (c) Earth – Orbiting artificial satellites are defined by six orbital elements           | 3. Perigee               |
| (d) The point of closest approach to earth   | 4. Kepler's first law    |

(a) (b) (c) (d)

- |                  |   |   |   |
|------------------|---|---|---|
| (A) 4            | 2 | 3 | 1 |
| (B) 3            | 2 | 4 | 1 |
| (C) 2            | 3 | 1 | 4 |
| <del>(D) 4</del> | 1 | 2 | 3 |

185. Consider the following statements :

Assertion (A) : Three axis stabilized satellites have the disadvantage that extendible solar arrays used in these satellites are unable to provide power when the satellite is in transfer orbit.

Reason (R) : The arrays are intact during this time.

Select your answer

- |  |                                  |
|--|----------------------------------|
| (A) (A) is true but (R) is false         | (B) Both (A) and (R) are false   |
| <del>(C) Both (R) and (A) are true</del> | (D) (A) is false but (R) is true |

186. Consider the following statements :

Assertion (A) : For the thermal – like noise, the spectral density of the noise power is constant.

Reason (R) : Referred to a flat spectrum.

Choose your answer

- (A) Both (A) and (R) are true (B) Both (A) and (R) are false  
(C) (A) is true but (R) is false (D) (A) is false but (R) is true

187. Match List – I with List – II and select the correct answer as per the codes :

- | List – I   |    | List – II               |  |
|--|----|-------------------------|--|
| (a) To ensure all bursts arrive the satellite in their correct time slots  | 1. | Loop back               |  |
| (b) Initial portion of a traffic burst that carries information similar to that carried in the reference burst   | 2. | Network synchronization |  |
| (c) It refers to the fact that an earth station receives its own transmission, from which it can determine range | 3. | Burst code word         |  |
| (d) It is used to establish burst timing in TDMA   | 4. | Preamble                |  |

- |     | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (A) | 3   | 2   | 4   | 1   |
| (B) | 2   | 3   | 4   | 1   |
| (C) | 2   | 4   | 1   | 3   |
| (D) | 1   | 2   | 3   | 4   |

188. Consider the following statements :

Assertion (A) : The propagation velocity of the acoustic wave is much higher than that of an electromagnetic wave.

Reason (R) : The surface acoustic wave device exhibits useful delay characteristics.

- (A) Both (A) and (R) are false (B) (A) is false but (R) is true  
(C) (A) is true but (R) is false (D) Both (A) and (R) are true

189. A given silicon avalanche photodiode has a quantum efficiency of 65% at a wavelength of 900 nm. Suppose  $0.5 \mu W$  of optical power produces a multiplied photocurrent of  $10 \mu A$ . What is the multiplication  $M$ ?
- (A) 33                      (B) 38                       (C) 43                      (D) 48
190. Laser diodes typically having response time of 1 ns and spectral width of 2 nm are capable of coupling luminescent power of
- (A) Less than ten milliwatt  
 (B) Tens to hundreds of microwatts  
 (C) Hundreds of watts  
 (D) Tens to hundreds of milliwatts
191. The least attenuation of standard single mode optical fibers are at
- (A) 1310 nm                      (B) 810 nm  
 (C) 1500 and 1300 nm                       (D) 1550 nm
192. The typical core dimensions of single mode step - index fiber is
- (A) 125 - 140  $\mu m$                       (B) 8 - 50  $\mu m$   
 (C) 8 - 12  $\mu m$                       (D) 50 - 200  $\mu m$
193. For a silica fiber the refractive index of core layer is 1.56 and that of cladding is 1.35. Calculate numerical aperture
- (A) 0.78                      (B) 7.8  
 (C) 0.078                      (D) 78
194. The radiative and non radiative recombination lifetimes of the minority carriers in the active region of a double - hetero junction LED are 60 nsec and 100 nsec respectively. What is the total carrier recombination lifetime?
- (A) 37.5 psec                       (B) 37.5 nsec  
 (C) 3.75 nsec                      (D) 3.75 psec

195. A source generates 4 messages. The entropy of the source will be maximum when
- (A) Two of the probabilities are 1/2 each and other is zero
  - (B) All probabilities equal
  - (C) One of the probabilities equal to 1 and two others are zero
  - (D) The probabilities are unequal
196. Given a channel with an intended capacity of 20 Mbits. The Bandwidth of this channel is 3 MHz. What is S/N ratio required in order to achieve this capacity?
- (A) 200
  - (B) 1000
  - (C) 10
  - (D) 100
197. Which statement is not correct?
- (A) When the probability is zero the information conveyed is zero
  - (B) When the probability is one the information conveyed is zero
  - (C) When the probability are equal the entropy is maximum
  - (D) When the probability are equal the entropy is minimum
198. A communication channel with AWGN has BW of 4 KHz and an SNR of 15. Its channel capacity is
- (A) 16 kbps
  - (B) 1.6 kbps
  - (C) 32 kbps
  - (D) 456 kbps
199. Which code has the highest efficiency?
- (A) Uniqly decodable code
  - (B) Kraft code
  - (C) Huffman code
  - (D) Shannon – Fano code
200. The maximum number of channel,  $C = \frac{125}{2t_e}$ ; where  $t_e$  is the memory cycle time. The expression for C is related to \_\_\_\_\_ memory switch
- (A) simple
  - (B) linear
  - (C) non linear
  - (D) digital