

Sl. No. : 401285

ECCM

Register
Number

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2013

**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

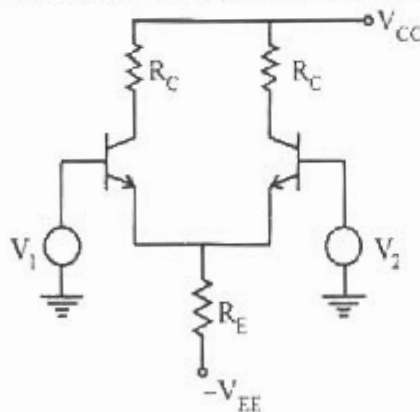
1. This Booklet has a cover (this page) which should not be opened till the invigilator gives signal to open it at the commencement of the examination. As soon as the signal is received you should tear the right side of the booklet cover carefully to open the booklet. Then proceed to answer the questions.
2. This Question Booklet contains 200 questions.
3. Answer **all** questions.
4. **All** questions carry equal marks.
5. 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.
6. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Register No., Question Booklet Sl. No. and other particulars with Blue or Black Ink Ball point pen on side 2 of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.
7. 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.
8. 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.
9. In the Answer Sheet there are **four** brackets [A] [B] [C] and [D] against each question. To answer the questions you are to mark with Ball point pen **ONLY ONE** bracket 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]
10. 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.
11. 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.
12. Do not tick-mark or mark the answers in the Question booklet.
13. The last sheet of the Question Booklet can be used for Rough Work.



SEAL

1. Consider the following statements S_1 and S_2 :
- S_1 : The β of a bipolar transistor reduces if the base width is increased.
 S_2 : The β of a bipolar transistor increases if the doping concentration in the base is increased.
- Which one of the following is correct ?
- (A) S_1 is false and S_2 is true. (B) Both S_1 and S_2 are true.
 (C) Both S_1 and S_2 are false. (D) S_1 is true and S_2 is false.
2. Cut-in voltage of a silicon diode is
 (A) 0.1 V (B) 0.2 V (C) 0.6 V (D) 0.25 V
3. The h-parameter model is more commonly used because
 (A) h-parameter can be measured more easily
 (B) h-parameter does not vary with frequency
 (C) the analysis, with h-parameter gives the same expression for the performance for all configurations
 (D) h-parameter model is an accurate representation
4. Bipolar transistor satisfies the relation
 (A) $\beta = \alpha$ (B) $\beta = \frac{\alpha}{1 - \alpha}$ (C) $\beta = \frac{1}{\alpha}$ (D) none of these
5. Consider the following four common type of transistors :
- | | |
|--------------------------------|-------------------------------------|
| 1. Point contact transistor | 2. Bipolar junction transistor |
| 3. MOS field effect transistor | 4. Junction field effect transistor |
- The correct arrangement of these transistors in the increasing order of input impedance is
 (A) 1, 2, 4, 3 (B) 1, 2, 3, 4 (C) 2, 1, 3, 4 (D) 2, 1, 4, 3
6. Avalanche photodiodes are preferred over PIN diodes in optical communication systems because of
 (A) Speed of operation (B) Higher sensitivity
 (C) Larger bandwidth (D) Larger power handling capacity
7. The variation of transconductance of FET is proportional to
 (A) I_{DS} (B) I_{DS}^2 (C) $\sqrt{I_{DS}}$ (D) I/I_{DS}
8. The Q point of a voltage divider bias circuit is
 (A) sensitive to change in current gain
 (B) totally insensitive to change in current gain
 (C) insensitive to change in temperature
 (D) insensitive to change in emitter resistor
9. Silicon is not suitable for fabrication of light emitting diodes because it is
 (A) an indirect band gap semiconductor
 (B) a direct band gap semiconductor
 (C) a wide band gap semiconductor
 (D) a narrow band gap semiconductor

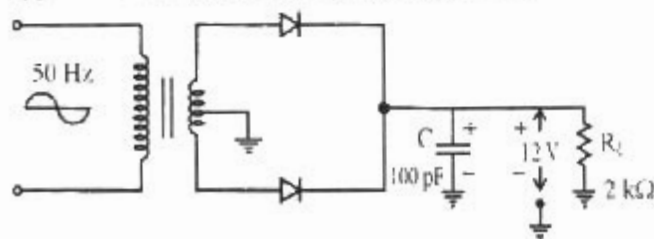
10. The magnitude of the negative resistance of a tunnel diode is maximum
 (A) at the peak point of the characteristics
 (B) at the valley point
~~(C) between the peak point and the valley point~~
 (D) beyond the valley point
11. Transformation utilization factor of a dc power supply may be defined as
 (A) $\frac{\text{Transformer secondary power}}{\text{Transformer primary power}}$ ~~(B) $\frac{P_{dc}}{P_{ac}(\text{rated})}$~~
 (C) $\frac{P_{dc}}{P_{ac}}$ (D) $\frac{P_{ac}}{P_{ac}(\text{rated})}$
12. The breakdown voltage of Zener diode ranges from _____ to _____
~~(A) 2V to 800V~~ (B) 4V to 900V
 (C) 6V to 1000V (D) 0.8V to 800V
13. The dynamic resistance of diode is
 (A) the resistance of diode when forward biased
 (B) the resistance of diode when reverse biased
~~(C) the AC opposition to the current flow~~
 (D) none of these
14. The forward amplification factor of a transistor corresponds to
 (A) the power gain of CE amplifier ~~(B) the current gain of CB amplifier~~
 (C) the voltage gain of CC amplifier (D) the voltage gain of CE amplifier
15. In an ideal differential amplifier shown in figure, a large value of R_E ,



- (A) increases both the differential and common-mode gains
 (B) increases the common-mode gain only
 (C) decreases the differential mode gain only
~~(D) decreases the common-mode gain only~~
16. Three identical single tuned amplifiers are connected in cascade. The 3 dB bandwidth of each amplifier is 100 kHz. The overall 3 dB bandwidth will be approximately
 (A) 300 kHz (B) 100 kHz ~~(C) 50 kHz~~ (D) 33 kHz

17. Consider the following statements regarding an RC phase-shift oscillator :
1. The amplifier gain is positive.
 2. The amplifier gain is negative.
 3. The phase shift introduced by the feedback network is 180° .
 4. The phase shift introduced by the feedback network is 360° .
- Of these statements,
- (A) 1 and 3 are correct ~~(B) 2 and 3 are correct~~
 (C) 2 and 4 are correct (D) 1 and 4 are correct
18. In Class-C operation of amplifiers, current flows through the active device for
- ~~(A) Less than half of the input cycle~~ (B) More than half of the input cycle
 (C) Whole of the input cycle (D) Half of the input cycle
19. An amplifier has a gain of 20 without feedback. If 10% of the output voltage is feedback by means of a resistance negative feedback circuit, the overall gain would be
- (A) 16.55 (B) 19.8 (C) 10.85 ~~(D) 6.67~~
20. In Class-B amplifier, the maximum power P_{\max} equals
- (A) $\frac{V_{cc}^2}{R_L}$ (B) $\frac{\sqrt{V_{cc}}}{2R_L}$ (C) $\frac{V_{cc}^2}{2\sqrt{R_L}}$ ~~(D) $\frac{V_{cc}^2}{2R_L}$~~
21. An ideal amplifier is one which
- (A) has infinite voltage gain
~~(B) responds only to signal at its input terminals~~
 (C) has positive feedback
 (D) give uniform frequency response
22. Unique features of a CC amplifier circuit is that it
- (A) steps up the impedance level
 (B) does not increase signal voltage
 (C) acts as an impedance matching device
~~(D) all the above~~
23. The frequency response of tuned amplifier resembles that of a
- (A) Low pass filter ~~(B) Band pass filter~~
 (C) High pass filter (D) Band stop filter
24. A Weinbridge oscillator has $R_1 = R_2 = 220 \text{ k}\Omega$ and $C_1 = C_2 = 250 \text{ pF}$. The frequency of oscillations will be nearly
- (A) 0.89 kHz (B) 1.89 kHz ~~(C) 2.89 kHz~~ (D) 3.89 kHz

25. The effect of dc saturation in a rectifier transformer is
 (A) to decrease the output
 (B) to increase the output
 (C) to decrease the ac components of the output
 (D) none of these
26. The rectifier, which requires minimum amount of filtering is
 (A) half-wave rectifier
 (B) full-wave rectifier
 (C) voltage doubler circuit
 (D) SCR half-wave rectifier
27. The power dissipation of the transistor equals the collector-emitter voltage times the
 (A) Base Current
 (B) Load Current
 (C) Zener Current
 (D) Fold back Current
28. The output impedance of a voltage regulator is
 (A) Very small
 (B) Very large
 (C) Equal to the load voltage divided by the load I
 (D) None of the above
29. A series RC circuit is fed from 5V d.c. source. If $R = 10 \Omega$ and $C = 1 \mu\text{F}$, the current will be maximum
 (A) 10μ sec after turn on
 (B) 50μ sec after turn on
 (C) immediately after turn on
 (D) after time $t = \infty$
30. A power supply has zero percentage regulation. What will be its full-load voltage if the no-load voltage is 100 V ?
 (A) 100 V
 (B) 0 V
 (C) 50 V
 (D) none of these
31. The ripple factor of the circuit shown below is :

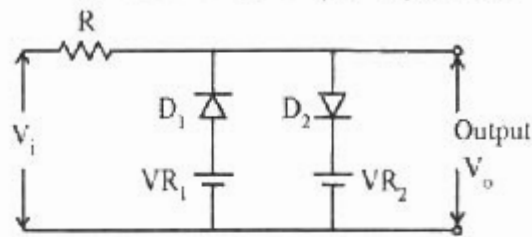


- (A) 1.21
 (B) 0.482
 (C) 14.43%
 (D) 1.443%

32. The function of bleeder resistance in filter circuits is
1. to maintain minimum current necessary for optimum inductor filter operation.
 2. to work as voltage divider in order to provide variable output from the supply.
 3. to provide discharge path to capacitors so that output becomes zero when the circuit has been de-energized.
- (A) All the correct (B) 1 alone is correct
(C) 1 and 2 are correct (D) 2 and 3 are correct
33. Ripple frequency of the output waveform of a full-wave rectifier when fed with a 50 Hz sine wave is
- (A) 100 Hz (B) 25 Hz (C) 50 Hz (D) 150 Hz
34. Percentage regulation of an ideal power supply is
- (A) 100% (B) 0% (C) 1% (D) none of these
35. The output frequency of an astable multivibrator using NE555 timer is given by,
- (A) $\frac{1.44}{(R_a + 2R_b)C}$ (B) $\frac{1}{(R_a + 2R_b)C}$
(C) $\frac{1}{1.44 (R_a + 2R_b)C}$ (D) $\frac{1.44}{(R_a + R_b)C}$
36. For proper working of a damper, the time constant should be
- (A) large (B) equal to signal time-period
(C) zero (D) less than 5 times the signal time period
37. What will be the period and frequency of oscillation for an astable multivibrator, given the following specifications ?
- $R_1 = 1 \text{ k}\Omega$ $R_2 = 5.6 \text{ k}\Omega$ $C_1 = 0.01 \text{ }\mu\text{F}$ $C_2 = 0.03 \text{ }\mu\text{F}$
- (A) 12.5 ms, 80 Hz (B) 1.25 μs , 800 kHz
(C) 1.25 ms, 800 Hz (D) 0.125 ms, 8 kHz
38. The frequency of oscillation of an UJT relaxation oscillator is
- (A) $f = R_1 C \ln \left[\frac{1}{1-n} \right]$ (B) $f = R_1 C \ln [1-n]$
(C) $f = \frac{1}{R_1 C \ln \left(\frac{1}{1-n} \right)}$ (D) $f = \frac{1}{R_1 C \ln (1-n)}$
39. Important applications of Schmitt trigger circuit are as below :
- (A) As an amplitude comparator (B) As a squaring circuit
(C) As a Flip Flop circuit (D) All the above

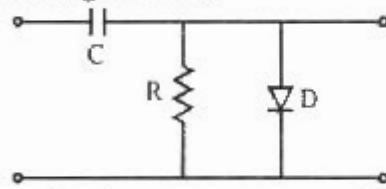
40. Bistable multivibrator can be induced to make an abrupt transition from one state to the other on application of
 (A) an internal excitation ~~(B) an external excitation~~
 (C) no excitation (D) none of the above

41. In the following circuit diagram, if the input $V_i \leq VR_1$, the O/P V_o is



- ~~(A) VR_1~~ (B) VR_2 (C) V_i (D) $VR_2 - VR_1$
42. An astable multivibrator has
 (A) one stable state ~~(B) two stable states~~
 (C) three stable states ~~(D) no stable states~~

43. Circuit shown in fig. is a basic



- (A) clipping circuit ~~(B) clamping circuit~~
 (C) two level clipper (D) none of these
44. A sweep waveform with a line period of (T) secs is to be passed through a RC high pass circuit with the least possible deviation from linearity. What is required, is that
~~(A) $RC \gg T$~~ (B) $RC = T$ (C) $RC \ll T$ (D) none of these
45. What is the maximum load current that one can draw from a 15 volt 3-pin regulator of the type 78L15?
 (A) 1 A (B) 0.5 A ~~(C) 100 mA~~ (D) 3 A

46. The output of phase comparator in general purpose PLL represents
~~(A) Demodulated FM~~ (B) AM
 (C) FM (D) PM

47. An operational amplifier having a slew rate of 62.8 v/m sec, is connected in a voltage follower configuration. If the maximum amplitude of the input sinusoid is 10 V, then the maximum frequency at which the output is undistorted.
~~(A) 1 mHz~~ (B) 6.28 mHz (C) 10 mHz (D) 62.8 mHz

48. The number of proton in Silicon atom are
 (A) 12 (B) 4 (C) 8 (D) 2
49. Op-Amp circuit consists of first two stages, which are
 (A) Cascade differential amplifier (B) Buffer amplifier
 (C) Driver (D) Emitter follower
50. Main drawbacks of the Binary weighted resistor D/A converter is
 (A) Wide range of resistor values (B) High reference voltage
 (C) More no. of switches (D) High power requirement
51. The general purpose PLL which is preferably used as AM demodulator is
 (A) NE 565 (B) NE 560 (C) NE 567 (D) NE 561
52. A phase lock loop works on the principle of feedback that is
 (A) regenerative (B) degenerative
 (C) either (A) or (B) (D) none of these
53. The frequency at which the gain of the op-amp is zero dB is known as
 (A) cross over frequency (B) unity gain cross over frequency
 (C) beat frequency (D) zero dB frequency
54. In general, the logic gates whose all output entries are '0' except for one entry
 (A) AND or NOR (B) OR or AND
 (C) NAND or NOR (D) EX-OR or OR
55. Mark the incorrect Boolean expression :
 (A) $1 + A = A'$ (B) $1 + A = 1$
 (C) $A + \bar{A} = 1$ (D) $A + AB = A$
56. It is desired to have a 64×8 memory. The memory available are of 16×4 size. The number of memories required will be
 (A) 8 (B) 6 (C) 4 (D) 2
57. Reduce the Boolean equation $AB + ABC + \bar{A}B + A\bar{B}C$
 (A) $A + BC$ (B) B (C) $B + AC$ (D) AC
58. The best representation of negative numbers is
 (A) sign magnitude form (B) 1's complement form
 (C) 2's complement form (D) 9's complement form

59. How many illegitimate states does a synchronous mod-6 counter have ?
 (A) 3 ~~(B) 2~~ (C) 1 (D) 0
60. Programmable logic array uses
~~(A) ROM matrices~~ (B) PROM matrices
 (C) RAM matrices (D) EPROM matrices
61. The octal equivalent of the decimal number 214 is
 (A) 325 ~~(B) 326~~ (C) 316 (D) 306
62. To implement the Boolean function $F(A, B, C) = \pi(0, 2, 4, 5, 6)$ with NOR-NOR logic how many number of 2-input NOR gates are required ?
~~(A) 3~~ (B) 2 (C) 6 (D) 5
63. The characteristic equation of the T-flip-flop is given by
 (A) $Q^+ = \bar{T}Q$ ~~(B) $Q^+ = T\bar{Q} + Q\bar{T}$~~
 (C) $Q^+ = TQ$ (D) $Q^+ = T\bar{Q}$
64. Number (-13) when represented in 1's complement form is
 (A) 11011001 (B) 10100111 ~~(C) 11110010~~ (D) 00001111
65. The output is "1" for like inputs and "0" for unlike inputs. This statement is representative of which logic gate ?
 (A) AND (B) OR ~~(C) EX NOR~~ (D) NAND
66. Which one of the following signal is used in DMA operation ?
 (A) $\overline{IO/M}$ (B) READY
~~(C) HOLD and HLDA~~ (D) \overline{RD} and \overline{WR}
67. Which one of the following is not correct ?
~~(A) 8051 provides 6 interrupt sources.~~
 (B) 8051 microcontroller uses memory mapped I/O through special function registers.
 (C) Microcontrollers are generally optimized for specific applications.
 (D) 8051 microcontroller has two 16-bit Timer/Counter registers.
68. The magnitude of largest number that can be placed on the data bus in a 16-bit processor is
~~(A) FFFF H~~ (B) 02FF H (C) 03FF H (D) 00FF H

69. Which of the following flag conditions are not available in 8085 processor ?
 (A) Zero flag (B) Parity flag
~~(C) Overflow flag~~ (D) Auxiliary carry flag
70. The clock frequency of 8086 is
 (A) 3 MHz ~~(B) 5 MHz~~ (C) 6 MHz (D) 2 MHz
71. Trap is _____ whereas RST7.5, RST6.5, RST5.5 are
 (A) Maskable, Non Maskable (B) Maskable, Maskable
~~(C) Non Maskable, Non Maskable~~ ~~(D) Non Maskable, Maskable~~
72. The instruction STA 2450 H is stored at 2100 H of 8085 memory location. The number of machine cycles need to execute this instruction are
 (A) 3 (B) 5 ~~(C) 4~~ (D) 2
73. The number of 8259 interrupt controllers required to be cascaded to provide interrupt facility to a maximum of 29 different devices are
~~(A) 4~~ (B) 3 (C) 5 (D) 7
74. A program that can be repeatedly used throughout a major program is
 (A) template (B) program module
~~(C) subroutine~~ (D) loop
75. An index register in digital computer is used for
~~(A) address modification~~ (B) indirect address
 (C) pointing to the stack address (D) storing one of the operands
76. Struct X { int item
 struct X * link } * a, * b, * c;
 The above structure suitably represents
 (A) doubly linked list ~~(B) single linked list~~
 (C) dynamic stack (D) dynamic queue
77. Two's complement of the binary number 10010100 is
 (A) 01101011 ~~(B) 01101100~~
 (C) 11101100 (D) 10001011
78. A search procedure which associates an address with a key value and provides a mechanism for dealing with two or more values assigned to the same address is called
 (A) Linear search (B) Binary search
~~(C) Hash coded search~~ (D) Radix search

79. The binary representation of the Hexadecimal number 3B7 F is
 (A) 0100 1001 1110 1101 ~~(B) 0011 1011 0111 1111~~
 (C) 0010 0100 0000 1010 (D) 0110 0011 1011 1100
80. A method of processing data in which data items are collected over a period of time and then forwarded to the computer in a group is the
 (A) real time processing (B) interactive processing
~~(C) batch processing~~ (D) off-line processing
81. If the maximum exponent that can be stored in a computer is 38, then the operation
 $w = x * y/z$ (PASCAL)
 for $x = 0.5 E 30$
 $y = 0.5 E 30$
 and $z = 0.25 E 30$
 will cause
 (A) underflow error ~~(B) overflow error~~
 (C) division by zero error (D) memory overflow error
82. Wagner ground connection in a bridge circuit is used
~~(A) to eliminate the effect of stray capacitance.~~
 (B) to reduce the effect of stray inductance.
 (C) to measure the frequency without error.
 (D) to make the bridge balanced.
83. Hooke's law is written as
 (A) applied force per unit area.
 (B) elongation of the stressed member per unit length.
~~(C) strain is equal to the ratio of stress to Young's modulus.~~
 (D) strain is equal to the ratio of Young's modulus to stress.
84. Which one of the following photosensitive device is used in the motion picture industry as sound-on-film sensors ?
~~(A) gas-type photo tube~~ (B) multiplier photo tube
 (C) photo conductive cell (D) photo voltaic cell
85. An instrumentation amplifier has
 1. finite gain
 2. a high impedance differential input
 3. a high common-mode voltage range.
 4. a high common-mode rejection.
 Of these statements,
 (A) 1 and 2 are correct ~~(B) All are correct~~
 (C) 1, 2 and 3 are correct (D) 2, 3 and 4 are correct
86. The use of thermocouple meters for ac measurement leads to a meter scale which is
 (A) linear ~~(B) square law~~ (C) logarithmic (D) exponential

87. Consider the following statements. A moving iron instrument :
- | | |
|----------------------------|---------------------------|
| 1. is an unpolarized meter | 2. has a permanent magnet |
| 3. has two iron vanes. | 4. has a fixed coil. |
- Of these statements,
- | | |
|----------------------------|---------------------------------------|
| (A) 1, 2 and 4 are correct | (B) 1, 2 and 3 are correct |
| (C) 2, 3 and 4 are correct | (D) 1, 3 and 4 are correct |
88. The input quantity to most of instrumentation systems is generally
- | | | | |
|----------------|----------------|-------------------------------|-------------|
| (A) Electrical | (B) Mechanical | (C) Non-electrical | (D) Thermal |
|----------------|----------------|-------------------------------|-------------|
89. The scale used for moving coil meter is
- | | | | |
|----------------|-----------------------|------------------|---------------|
| (A) non-linear | (B) linear | (C) square scale | (D) log scale |
|----------------|-----------------------|------------------|---------------|
90. A wire strain gauge with a gauge factor $k = 2$ is bonded to a steel member which is subjected to a strain of 10^{-6} . If original to strain resistance of a gauge is 120Ω , the change in gauge resistance
- | | | | |
|---------------------|---|---------------------------|---------------------------|
| (A) $120 \mu\Omega$ | (B) $240 \mu\Omega$ | (C) $120 \text{ m}\Omega$ | (D) $240 \text{ m}\Omega$ |
|---------------------|---|---------------------------|---------------------------|
91. Which of the following is not used in making resistance-temperature transducer ?
- | | | | |
|------------|--------------|-------------------------|------------|
| (A) Copper | (B) Platinum | (C) Tungsten | (D) Nickel |
|------------|--------------|-------------------------|------------|
92. Load cells are
- | |
|--|
| (A) Electrical sensors used for flow measurement |
| (B) Mechanical sensors used for flow measurement |
| (C) Electrical sensors used for force measurement |
| (D) Mechanical sensors used for force measurement |
93. Gas flow and gas pressure can be measured by
- | | |
|--------------------------|-----------------------------|
| (A) Potentiometer device | (B) Dielectric gauge |
| (C) Eddy current gauge | (D) Pirani gauge |
94. The active device used in parametric microwave amplifier is the
- | | |
|----------------|-------------------------------|
| (A) Gunn diode | (B) IMPATT diode |
| (C) PIN diode | (D) Varactor diode |
95. Most of the power measuring microwave devices measure
- | | |
|------------------------------|-------------------|
| (A) average power | (B) peak power |
| (C) instantaneous power | (D) none of these |
96. A magic tee is a modification of
- | |
|---|
| (A) E-plane tees |
| (B) H-plane tees |
| (C) a combination of E-plane and H-plane tees |
| (D) None of the above |
97. A magnetron has an average power output of 50 W and a duty cycle of 2% . its peak output power is
- | | | | |
|--------------------|---------------------|--|------------------------|
| (A) 25 W | (B) 100 W | (C) 2500 W | (D) $10,000 \text{ W}$ |
|--------------------|---------------------|--|------------------------|

98. Which of the following devices can be used in X-band microwave amplifier for low noise performance ?
 (A) FET (B) BJT ~~(C) Gunn diode~~ (D) IMPATT diode
99. The compound semiconductor that is not used to manufacture Gunn diode is
~~(A) indium arsenide~~ (B) gallium arsenide
 (C) indium phosphide (D) cadmium telluride
100. Microwave system consists of a transmitter subsystem including
 (A) Transmitting antenna, wave guide, receiving antenna
 (B) Receiving antenna, transmission line
 (C) Transmitting receiver, receiving antenna, waveguide
~~(D) Transmitting antenna, transmission line, microwave oscillator~~
101. Frequency range of microwave is given by
 (A) 30 cm – 1 mm (B) 0.1 GHz – 30 GHz
~~(C) 1 GHz – 300 GHz~~ (D) More than 300 GHz
102. "A loaded cavity has a lower value of Q-factor than an unloaded cavity." Is it true ?
~~(A) Yes~~ (B) No
 (C) Not necessarily (D) It is senseless
103. Which of the following statement is correct in the directional coupler ?
~~(A) The coupling co-efficient is not particularly frequency sensitive but the directivity is a sensitive function of frequency.~~
 (B) The coupling co-efficient is particularly frequency sensitive but the directivity is not a sensitive function of frequency.
 (C) Both coupling co-efficient and directivity are sensitive functions of frequency.
 (D) Both coupling co-efficient and directivity are not sensitive functions of frequency.
104. Pulse communication system that is inherently highly immune to noise is
 (A) PWM (B) PAM (C) PPM ~~(D) PCM~~
105. One of the following communication system is digital .
 (A) AM (B) FM ~~(C) Delta~~ (D) PAM
106. Frequency shift keying is used mostly in
 (A) radio transmission ~~(B) telegraphy~~
 (C) telephony (D) none of these
107. Which one of the following is used in TV broadcast ?
 (A) DSB-SC (B) DSB
 (C) SSB ~~(D) VSB transmission~~
108. Total bandwidth needed for an AM signal at 55.25 MHz with 0.5 MHz video modulation is
 (A) 0.25 MHz (B) 0.5 MHz ~~(C) 1 MHz~~ (D) 10 MHz

109. A Transmitter radiates 9 kW with carrier unmodulated and 10.125 kW when carrier is sinusoidally modulated. The modulation index will be
 (A) 40% (B) 44% ~~(C) 50%~~ (D) 66%
110. Which of the following is the correct statement ?
 (A) If IF is high, tracking will be improved.
 (B) If IF is high, the receiver will have poor selectivity and poor sensitivity.
 (C) If IF is high, image rejection will be very good.
~~(D) If IF is low, selectivity becomes poorer.~~
111. Companding is used in PCM to
 (A) reduce bandwidth (B) reduce power
~~(C) increase SNR~~ (D) have uniform SNR
112. An antenna is synonymous to a
 (A) generator (B) reflector ~~(C) transducer~~ (D) regulator
113. An open circuited ($\lambda/4$) line has an input impedance of
 (A) infinity (B) Z_0 ~~(C) Zero~~ (D) none of these
114. The rectangular metal box can be used as resonator at
 (A) Radio frequency ~~(B) Microwave frequency~~
 (C) Power frequency (D) Low frequency
115. The reflection co-efficient is $1/5$, the corresponding VSWR is given by
 (A) 1 ~~(B) 1.5~~ (C) 1.8 (D) 2
116. A lossless transmission line having 50Ω characteristic impedance and length ' $\lambda/4$ ' is short circuited at one end and connected to an ideal voltage source of $1V$ at the other end. The current drawn from the voltage source is
~~(A) 0~~ (B) $0.02 A$ (C) ∞ (D) none of these
117. A transmission line whose characteristic impedance is a pure resistance
 (A) must be a lossless line (B) must be a distortion line
~~(C) may not be a lossless line~~ (D) may not be a distortion line
118. Ground wave must be
 (A) linearly polarized (B) circularly polarized
~~(C) vertically polarized~~ (D) horizontally polarized
119. For a transmission line load matching, over a rang of frequencies, it is best to use
 (A) balun (B) broad baud directional coupler
~~(C) double stub~~ (D) single stub of adjustable position
120. Short term fading is commonly observed in
 (A) ground wave propagation (B) satellite communication
~~(C) troposcatter communication~~ (D) none of these
121. In an end fire array with antenna spacing of $\lambda/4$, the elements are fed
 (A) in phase ~~(B) 90° out of phase~~
 (C) 180° out of phase (D) at random

122. If a transmission line terminated with a load equal to be characteristic impedance the reflection co-efficient is

- (A) +1 (B) -1 (C) 0 (D) infinity

123. The dimensions for a rectangular waveguide are 1.28×0.6 cm. The cut-off frequency for YE_{10} mode is

- (A) 13.1 GHz (B) 12.4 GHz (C) 6.56 GHz (D) 8.2 GHz

124. The transfer function of passive low pass filter is

- (A) $H(S) = \frac{1}{1 + RCS}$ (B) $H(S) = \frac{1}{1 - RCS}$
 (C) $H(S) = \frac{1}{1 + RC}$ (D) none of the above

125. Transfer function of passive high pass filter is

- (A) $H(S) = \frac{RCS}{1 + RCS}$ (B) $H(S) = \frac{1}{1 + RCS}$
 (C) $H(S) = \frac{RCS}{1 - RCS}$ (D) none of the above

126. Consider a causal LTI system with frequency response

$$H(j\omega) = \frac{1}{j\omega + 3}$$

This system produces the output to input $x(t)$ as follows :

$$y(t) = e^{-2t} u(t) - e^{-4t} u(t)$$

The input $x(t)$ is

- (A) $(2e^{-4t} - 3e^{-3t}) u(t)$ (B) $e^{-4t} u(t)$
 (C) $(3e^{-4t} - 2e^{-3t}) u(t)$ (D) $e^{-4t} u(t)$

127. Determine the discrete-time Fourier Transform for the given signal and choose the correct option

$$x[n] = \{-2, -1, 0, 1, 2\}$$

↑

- (A) $2j(2 \sin 2\Omega + \sin \Omega)$ (B) $2(2 \cos 2\Omega - \cos \Omega)$
 (C) $-2j(2 \sin 2\Omega - \sin \Omega)$ (D) $-2(2 \cos 2\Omega - \cos \Omega)$

128. Unit sample sequence is a

- (A) unit step signal (B) unit sample signal
 (C) unit impulse signal (D) unit exponential signal

129. If the sequence $x(s)$ is real and odd (or) imaginary and even, then $x(k)$ is

- (A) purely real (B) purely imaginary
 (C) zero (D) complex value

130. A T-type attenuator is designed for an attenuation of 40 dB and terminating resistance of 75Ω . Which of the following values represent full series arm R_1 and shunt arm R_2 ?

1. $R_1 = 147 \Omega$ 2. $R_1 = 153 \Omega$
 3. $R_2 = 1.5 \Omega$ 4. $R_2 = 3750 \Omega$
 (A) 1 and 3 (B) 1 and 4 (C) 2 and 3 (D) 2 and 4

131. For a 16 point DFT computation the improvement in speed for multiplication by using FFT algorithm compare to direct computation is
 (A) 5.3 times ~~(B) 4 times~~ (C) 6.4 times (D) 12 times

132. Attenuator is a pure resistance
 (A) network producing a constant attenuation at high frequencies.
 (B) network producing a variable attenuation at a variable frequency.
~~(C) producing a constant attenuation at all frequencies.~~
 (D) producing a constant attenuation at low frequencies.

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

List – I
(Receiver Controls)

- (a) Brightness
 (b) Contrast
 (c) AGC level
 (d) Vertical hold

List – II
(Functions)

- (1) It varies gain of the video amplifier
 (2) It varies the frequency of the vertical oscillator
 (3) It varies the DC bias for the picture tube
 (4) It varies gain of RF and IF stages

Codes :

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

134. Consider the following statements :

Assertion (A) : Television screen width is always greater than the screen height.

Reason (R) : Picture motion is in horizontal direction.

Select your answer according to 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 and (R) is true.

135. According to CCIR standards, the television screen is blanked out

- (A) 25 times in one second ~~(B) 50 times in one second~~
 (C) 15,625 times in one second (D) 60 times in one second

136. Match List – I correctly with List – II and select your answer using the codes given below :

List – I

- (a) Delta gun colour picture tube
 (b) Interlacing
 (c) Precision in line picture tube
 (d) Vestigial side band

List – II

- (1) avoids flicker
 (2) three colour dots arranged in groups
 (3) reduces bandwidth
 (4) three colour dots arranged in vertical strip

Codes :

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

137. How the signals are generated in TV ?
 (A) Colour images are converted into video signals by picture tube
 (B) Camera tube
 (C) Deflection tube
 (D) Tuners
138. How the colour picture tubes are classified ?
 (A) According to gun configuration and phosphor arrangement
 (B) According to phosphor arrangement
 (C) According to gun configuration
 (D) According to deflection coils
139. Fine tuning control in television receiver is
 (A) a preset inductance (B) a potentiometer
 (C) a variable condenser (D) none of these
140. The phosphor type number used in tricolour picture tube is
 (A) P1 (B) P4 (C) P22 (D) P31
141. A scan type radar display can
 (A) indicate only the target range
 (B) indicate only the target bearing
 (C) indicate both range as well as direction of target
 (D) none of these
142. PPI scan type radar display can
 (A) indicate only the target bearing
 (B) indicate only the target range
 (C) indicate both the target range as well as direction
 (D) be used to produce target image
143. The frequency range of K band for the radar system is
 (A) 18 - 26.5 GHz (B) 24.05 - 24.25 GHz
 (C) 27 - 40 GHz (D) 33.4 - 36.0 GHz
144. Gain of a radar antenna is defined as
 (A) Gain $G = \text{Output/Input}$
 (B) Concentration of energy in particular direction
 (C) Gain $G = \text{Input/Output}$
 (D) Concentration of energy in both directions
145. The A-scope of a radar displays
 (A) no "grass" (B) target position and range
 (C) target range but not the position (D) target position but not the range
146. A typical radar antenna has beam width of about
 (A) 1° (B) 2° (C) 3° (D) 5°

147. An automotive radar operates at a frequency of 8 GHz. The Doppler shift due to an automobile directly approaching the radar at a speed of 160 km per hour is
~~(A)~~ 2.37 kHz (B) 23.7 kHz (C) 8 kHz (D) 8 GHz
148. The sensitivity of a radar receiver is ultimately set by
 (A) high SNR (B) lower limit of useful signal out
~~(C)~~ overall noise temperature (D) pulse energy
149. Long distance communication system via satellite uses frequency range
 (A) 10 to 100 GHz (B) 1 to 2.5 MHz
 (C) 50 to 100 GHz ~~(D)~~ 3 to 6 GHz
150. Match List - I with List - II and select the correct answer as per the codes given below :
- | List - I | | List - II (Applications) | |
|----------|----------|--------------------------|------------------------|
| (a) | Intelsat | (1) | Multipurpose |
| (b) | INSAT | (2) | Communication |
| (c) | TIROS | (3) | Atmospheric monitoring |
| (d) | SROSS | (4) | Meteorological |
- Codes :**
- | | (a) | (b) | (c) | (d) |
|----------------|-----|-----|-----|-----|
| (A) | 2 | 4 | 3 | 1 |
| (B) | 1 | 2 | 3 | 4 |
| (C) | 2 | 1 | 4 | 3 |
| (D) | 4 | 3 | 2 | 1 |
151. In Satellite antennas, the available noise from a thermal noise is given by
 (A) $P_n = K T_p B_n^2$ (B) $P_n = K T_p^2 B_n$
~~(C)~~ $P_n = K T_p B_n$ (D) Nothing
152. The number of Active transponders are carried by a high capacity satellite are
 (A) 10 - 12 transponders ~~(B)~~ 12 - 44 transponders
 (C) 12 - 18 transponders (D) 16 - 44 transponders
153. Energy required for satellite is generally derived from
 (A) Solar cells and Nickel-cadmium cells
~~(B)~~ Solar cells
 (C) Nickel-cadmium cells
 (D) Nuclear generators
154. Geostationary satellites are generally placed in
~~(A)~~ equatorial orbit (B) polar orbit
 (C) inclined orbit (D) circular orbit
155. If (G) is the earth's gravitational constant and (M) is the mass of earth, then for a circular orbit of radius (R), the satellite's orbital velocity (V) is given by
~~(A)~~ $V = \sqrt{GM/R}$ (B) $V = \sqrt{GM/2R}$
 (C) $V = \sqrt{R/GM}$ (D) $V = \sqrt{2G/RM}$

156. East-West station keeping are obtained by
 (A) applying a thrust impulse perpendicular to the orbital plane
 (B) applying a thrust impulse parallel to the orbital plane
~~(C) applying a thrust in the orbital plane~~
 (D) firing appropriate thrusters
157. One of the following satellite systems being used for weather forecast application :
~~(A) TIROS-N~~ (B) COMSAT (C) GORIZONT (D) SPOT
158. Satellite capacity depends on
 (A) Weight that can be placed in orbit
 (B) Panel area available for energy dissipation
 (C) Transmitter power
~~(D) All of the above~~
159. The spread spectrum communication techniques are used in one of the following multiple access methods in satellite communication :
 (A) Time Division Multiple Access (TDMA)
 (B) Frequency Division Multiple Access (FDMA)
~~(C) Code Division Multiple Access (CDMA)~~
 (D) Random Access
160. In Satellite communication, a repeater is placed between
~~(A) many transmitting stations and many receiving stations~~
 (B) many transmitting stations and one receiving station
 (C) one transmitting station and many receiving stations
 (D) one transmitting station and one receiving station
161. A satellite earth station antenna having a maximum gain of 60 dB at the operational frequency is fed from a power amplifier generating 10 kW. If the feed system has a loss of 2 dB, earth station EIRP is
~~(A) 98 dBW~~ (B) 72 dBW (C) 102 dBW (D) 68 dBW
162. The signal is sent back to earth by satellite by means of
 (A) Chicken mesh Antenna (B) ~~Horn Antenna~~
 (C) Yagi Antenna (D) Duplexer
163. A satellite earth station has
 (A) only receiving equipments (B) only transmitting equipments
~~(C) (A) and (B) both~~ (D) none of these
164. A satellite that simply reflects back the signals from one region of the earth to the other region is known as
 (A) Orbiting satellite (B) Geostationary satellite
 (C) Active satellite ~~(D) Passive satellite~~

165. A Geostationary satellite completes one orbit in
 (A) One hour (B) 5 hours ~~(C) 24 hours~~ (D) 28 days
166. Distance of geostationary satellite from surface of earth is nearly
 (A) 360 km (B) 3600 km ~~(C) 36000 km~~ (D) 360000 km
167. Which of the following statement is not correct ?
 (A) A beam of light may be modulated to carry speech.
~~(B) Blinking light signals from ship to ship use modulated light beams.~~
~~(C) Short wave radio uses short wavelengths than that exist in light beam.~~
 (D) Rays of 1\AA wavelength pass through glass more easily than rays of 1000\AA .
168. For photoelectric emission to be possible over the whole visible region 4000\AA to 800\AA , the work function of photosensitive surface must be
 (A) more than 2.5 eV ~~(B) less than 1.55 eV~~
 (C) equal to 3.5 eV (D) equal to 1.2 eV
169. A ray of light is passing from a silica glass of refractive index 1.48 to another silica glass of refractive index 1.46. What is the range of angles for which this ray will undergo total internal reflection ?
 (A) $0^\circ, -80^\circ$ ~~(B) $81^\circ, -90^\circ$~~ (C) $90^\circ, -180^\circ$ (D) $180^\circ, -360^\circ$
170. Waveguide dispersion is a function of
 (i) core radius (ii) refractive index difference
 (iii) composition of the material (iv) shape of the refractive index profile
 (A) (i) and (ii) are correct (B) (i), (ii), (iii) are correct.
~~(C) (i), (ii), (iv) are correct.~~ (D) All are correct.
171. The sources for fibre optical communication is
 (A) LED (B) Laser (C) Photo diode ~~(D) Both (A) and (B)~~
172. Consider the following statements :
 Losses in optical fibres are caused by
 1. impurities in the fibre material 2. microbending
 3. splicing 4. step index profile
 Of these statements,
 (A) 1, 3 and 4 are correct. (B) 2, 3 and 4 are correct.
~~(C) 1, 2 and 3 are correct.~~ (D) 1, 2 and 4 are correct.
173. The maximum value of entropy is
~~(A) 1~~ (B) 2 (C) 4 (D) 8
174. According to Shanon's theorem, the output from any source of rate R can be coded and transmitted over channel capacity C with the condition that
 (A) $C < R$ (B) $C < R^2$ ~~(C) $C > R$~~ (D) $C > R^2$
175. Consider a discrete memory-less source with source alphabet, $S = \{S_0, S_1, S_2, S_3, S_4\}$ with respective probabilities of $P = \{0.4, 0.2, 0.2, 0.1, 0.1\}$. Find the average code word length
~~(A) 2.2~~ (B) 2.4 (C) 2 (D) 2.1

176. The minimum transmitter power requirement in the absence of channel coding of a communication system is 2W. If a channel coding scheme of 3 dB is incorporated in the system, the minimum required transmitter power is

- (A) 2 dB ~~(B) 3 dB~~ (C) 1 dB (D) 6 dB

177. Which of the codes given below satisfies the Kraft Mcmillan inequality ?

| Code A | Code B | Code C | Code D |
|--------|--------|--------|--------|
| 00 | 0 | 0 | 0 |
| 01 | 10 | 11 | 100 |
| 10 | 11 | 100 | 110 |
| 11 | 110 | 110 | 111 |

- (A) Code A and Code B (B) Code A, B and C
~~(C) Code A, C and D~~ (D) Code B, C and D

178. A rectangular pulse of amplitude A and time duration Z is applied to be matched filter. Its maximum SNR is

- ~~(A) $\frac{2A^2Z}{\eta}$~~ (B) $\frac{A^2Z}{2\eta}$ (C) $\frac{2AZ}{\eta}$ (D) $\frac{2A^2}{\eta Z}$

179. In communication system a trade-off can be made between transmission bandwidth and

- (A) output SNR (B) input SNR
~~(C) channel capacity~~ (D) none of these

180. A given source will have maximum entropy if all the messages produced are

- (A) statistically independant ~~(B) equiprobable~~
 (C) mutually exclusive (D) having finite power

181. In automatic exchange, switching is done by

- ~~(A) electromechanical or electronic switch gear with the help of the operator.~~
 (B) electromechanical and electronic switch gear.
 (C) electromechanical or electronic switch gear without the help of the operator.
 (D) none of these

182. Cross-talk is

- ~~(A) distortion in adjacent telephone lines~~
 (B) distortion in demodulated signal
 (C) interference in electromagnetic waves
 (D) distortion in adjacent telegraphy lines

183. Network traffic is nothing but

- ~~(A) Packets are arranged in queue~~ (B) FIFO
 (C) LIFO (D) None of the above

184. Types of signalling systems in telephony

- (A) Base band signalling
 (B) Spread spectrum
~~(C) Station signalling and interoffice signalling~~
 (D) Interoffice signalling

185. Match List - I correctly with List - II and select your answer using the codes given below :

| List - I | | List - II | |
|---|--|---|--|
| (a) Busy hour call rate | | (1) analog time switching | |
| (b) PAM signal | | (2) ratio of lost calls to total number of calls made | |
| (c) Grade of service of switch exchange | | (3) Digital time switching | |
| (d) PCM signal | | (4) average calls per subscriber during busy hour | |

Codes :

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

186. In message switching

- ~~(A)~~ messages are split into number of packets
- (B) the entire message is transmitted continuously without a break from one node to another
- (C) the entire message is transmitted from one node to another
- (D) half the message is transmitted from one node to another

187. The baud rate is

- (A) always equal to the bit transfer rate
- ~~(B)~~ equal to twice the bandwidth of an ideal channel
- (C) not equal to the signalling rate
- (D) equal to one-half the bandwidth of ideal channel

188. In telegraphy relay, the polarising flux increases the

- ~~(A)~~ sensitivity of the relay
- (B) speed of operation
- (C) capacity of relay
- (D) all of these

189. Splice is

- (A) a non-permanent connection of two fibres
- ~~(B)~~ a non-separable junction of two fibres
- (C) a process of cutting a fibre at the ends
- (D) none of these

190. The primary function of a clamper circuit is to

- (A) suppress variations in signal voltage
- (B) raise positive half-cycle of the signal
- (C) lower the negative half-cycle of the signal
- ~~(D)~~ introduce a d.c. level into an a.c. signal

191. The Lissajous pattern obtained on a CRO is used to determine
 (A) amplitude of applied signal (B) current in a circuit
~~(C) phase shift and frequency~~ (D) distortion in a system
192. Which type of speaker is used in telephone receivers ?
 (A) Tweeter type (B) Moving coil type
 (C) Coaxial type ~~(D) Fixed coil type~~
193. Helical antenna is used for satellite tracking because of its
~~(A) circular polarisation~~ (B) good front to back ratio
 (C) broad bandwidth (D) high gain
194. Pre-emphasis in FM systems involves
 (A) Compression of the modulated signal.
 (B) Expansion of the modulated signal.
 (C) Amplification of lower frequency components of the modulating signal.
~~(D) Amplification of higher frequency components of the modulating signal.~~
195. A photo-diode is used in reverse-biased because
 (A) majority swept are reverse across the junction.
 (B) only one side illuminated.
 (C) reverse current is small as compared to photo current.
~~(D) reverse current is large as compared to photo current.~~
196. The nominal uplink and downlink frequencies of earth station's antenna in the C band are
~~(A) 6 GHz, 4 GHz~~ (B) 4 GHz, 6 GHz
 (C) 14 GHz, 12 GHz (D) 12 GHz, 14 GHz
197. Travelling wave tube is suitable for
~~(A) broad frequency band of operation~~
 (B) low noise amplification
 (C) narrow band of operation
 (D) handling low power operation
198. In n-variable k-Map, if all the cells are filled with "high", then it is reduced to
~~(A) I~~ (B) O (C) Z (D) U
199. An amplifier's power level is changed from 8 watts to 16 watts, equivalent dB gain is
 (A) 2 dB (B) 6 dB ~~(C) 3 dB~~ (D) 5 dB
200. A radar system uses a rotating antenna to
 (A) determine the target range ~~(B) determine the target bearing~~
 (C) identify the target (D) determine target velocity