ACE Engineering Academy
Leading Institute for ESE/GATE/PSUs

ESE-2022
(PRELIMINARY EXAMINATION)

QUESTIONS WITH DETAILED SOLUTIONS

ELECTRONICS & TELECOMMUNICATION ENGINEERING

ACE Engineering Academy has taken utmost care in preparing the ESE-2022 Preliminary Examination solutions. Discrepancies, if any, may please be brought to our notice. ACE Engineering Academy do not owe any responsibility for any damage or loss to any person on account of error or omission in these solutions. ACE Engineering Academy is always in the fore front of serving the students, irrespective of the examination type (GATE/ESE/PSUs/PSC/GENCO/TRANSCO etc.,).

All Queries related to ESE - 2022 Preliminary Solutions are to be sent to the following email address hyderabad@aceenggacademy.com

Contact Us : 040-23234418,19,20

ESE - 2022

ELECTRONICS & TELECOMMUNICATION ENGG.

Questions with Detailed Solutions

20/02/22

Set-B

SUBJECTWISE WEIGHTAGE

S. No.	NAME OF THE SUBJECT	Total Number of Questions
01	Basic Electronics Engineering	5
02	Basic Electrical Engineering	9
03	Materials Science	12
04	Electronic Measurements and Instrumentation	11
05	Network Theory	16
06	Analog Circuits	8
07	Digital Circuits	15
08	Analog and Digital Communication Systems	11
09	Control Systems	12
10	Signals & Systems	5
11	Computer Organization and Architecture	12
12	Electro Magnetics	12
13	Advanced Electronics	6
14	Advanced Communication	16
Total No. of Questions		**150**

01. Convert $(329.54)_{10}$ to hexadecimal.

(a) $(149 . 8A3D70A)_{16}$ (b) $(219 . 8A3D70A)_{16}$

(c) $(149 . 8A70AD)_{16}$ (d) $(219 . 8A70AD)_{16}$

01. Ans: (a)

Sol: $(329.54)_{10}$

Integer part

16	329
16	20 – 9
	1 – 4

Fraction part

$0.54 \times 16 = 8.64 \Rightarrow 8$

$0.64 \times 16 = 10.24 \Rightarrow A$

$0.24 \times 16 = 3.84 \Rightarrow 3$

$0.84 \times 16 = 13.44 \Rightarrow D$

$0.44 \times 16 = 7.07 \Rightarrow 7$

$0.04 \times 16 = 0.64 \Rightarrow 0$

$0.64 \times 16 = 10.24 \Rightarrow A$

$(329.54)_{10} = (149.8A3D70A)_{16}$

02. Represent the decimal number 396 in binary, Gray and excess-3 codes respectively,

(a) 110001100, 101011010, 110001111

(b) 110001010, 101101011, 110010000

(c) 101001010, 110001100, 110011111

(d) 110001100, 101001010, 110001111

02. Ans: (*)

Sol:

2	396
2	198 – 0
2	99 – 0
2	49 – 1
2	24 – 1
2	12 – 0
2	6 – 0
2	3 – 0
	1 – 1

Binary equivalent = 110001100

Gray equivalent = 101001010

Excess-3 equivalent = 011011001001

03. The most personal computers (PCs) compatible computer systems use a 20-bit address code to identify each of over 1 million memory locations. What is the 5-digit hexadecimal address of the 500th memory location?

(a) 001F3

(b) 001F4

(c) 001F5

(d) 001F6

03. Ans: (a)

Sol:

2	500
2	250 – 0
2	125 – 0
2	62 – 1
2	31 – 0
2	15 – 1
2	7 – 1
2	3 – 1
	1 – 1

$= (111110100)_2 = (1F4)_{16}$

The 500^{th} memory location address is 1F4 – 1 = 1F3

04. Simplify the following Boolean function:

$f(A,B,C) = \overline{A}BC + A\overline{B}C + AB\overline{C} + ABC$

(a) $\overline{A}BC + A\overline{B}C + AB$

(b) $A\overline{B}C + AC + AB$

(c) $AB + BC + AC$

(d) $\overline{A}BC + AC + AB$

04. Ans: (a & c)

Sol: Given $F = \Sigma m\,(3, 5, 6, 7)$

It is C_{i+1} of FA

We know

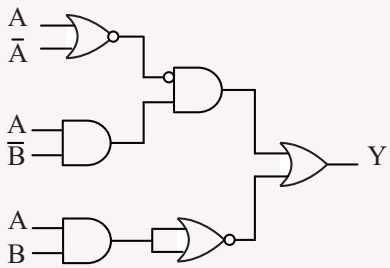
$C_{i+1} = AB + BC_i + C_iA$

(or)

$C_{i+1} = C_i(A \oplus B) + AB$

$= \overline{A}BC_i + A\overline{B}C_i + AB$

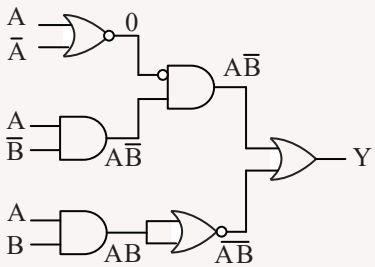
05. What is the output Y for the logic circuit shown in the figure?



(a) $A\bar{B} + \bar{A}B$ (b) $A\bar{B} + \bar{A} + \bar{B}$
(c) $A\bar{B} + \overline{AB}$ (d) $\bar{A} + \bar{B}$

05. Ans: (b, c & d)

Sol:



$Y = A\bar{B} + \overline{AB}$
$= A\bar{B} + \bar{A} + \bar{B}$
$= \bar{A} + \bar{B}$

06. A, B and C_{in} are the three inputs of a full adder circuit and D_0, D_1,...,D_7 are the inputs of 8:1 multiplexer. S_2 (MSB), S_1 and S_0 (LSB) are the selection lines of the multiplexer. To implement the expression of sum of full adder circuit using this multiplexer, the connections of the input ports and selection lines are

(a) $D_0 = D_3 = D_5 = D_6 = 0$, $D_1 = D_2 = D_4 = D_7 = 1$, $S_2 = A$, $S_1 = B$ and $S_0 = C_{in}$

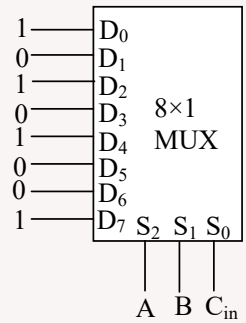
(b) $D_0 = D_3 = D_5 = D_6 = 1$, $D_1 = D_2 = D_4 = D_7 = 0$, $S_2 = C_{in}$, $S_1 = B$ and $S_0 = A$

(c) $D_0 = D_2 = D_3 = D_6 = 0$, $D_1 = D_4 = D_5 = D_7 = 1$, $S_2 = A$, $S_1 = B$ and $S_0 = C_{in}$

(d) $D_0 = D_1 = D_5 = D_7 = 1$, $D_2 = D_3 = D_4 = D_6 = 0$, $S_2 = C_{in}$, $S_1 = B$ and $S_0 = A$

06. Ans: (a)

Sol: From the sum expression of full adder:
$f(A,B,C_{in}) = \Sigma m(1,2,4,7) = m_1 + m_2 + m_4 + m_7$



07. The data sheet of a certain flip-flop specifies that the minimum HIGH time $t_w(H)$ for the clock pulse is 16 nano- seconds and the minimum LOW time $t_w(L)$ is 29 nanoseconds. What is the maximum operating frequency for the given flip-flop?

(a) 62.50 MHz (b) 31.25 MHz
(c) 22.22 MHz (d) 11.11 MHz

07. Ans: (c)

Sol: $t_w(H) = 16ns$; $t_w(L) = 29ns$

$T = t_w(H) + t_w(L) = 45ns$

$f = \frac{1}{T} = \frac{1}{45ns} = 22.22$ MHz

08. The Schmitt trigger can be used as which of the following?

1. Square-wave generator
2. Comparator
3. Astable multivibrator

Select the correct answer using the code given below.

(a) 1 and 3 only (b) 1 and 2 only
(c) 2 and 3 only (d) 1, 2 and 3

08. Ans: (b)

Sol: A Schmitt trigger is a bistable circuit or flip flop. It is used in function generators for generating square wave. It its output is given to Integrator we can also generate triangular waves.

It is a regenerative comparator

ACE® Engineering Academy

Leading Institute for ESE/GATE/PSUs

Since 1995

26 Years of Excellence

62 AIR 1st in GATE

19 AIR 1st in ESE

AST

ACE SCHOLARSHIP TEST

ESE | GATE | PSUs | SSC

GET WORTH 3CR SCHOLARSHIPS

6TH MARCH 2022

EXAM DATE

11 AM – 12:30 PM

TIMING

A NATIONAL LEVEL SCHOLARSHIP TEST FOR ENGINEERS

(CE | ME | EC | EE | CS | IN | PI)

EXAM DETAILS

- Total: 75 Marks
- No. of Questions: 50
  (25Q: 1 Mark, 25Q: 2 Marks)
- Duration: 90 Mins.
- Mode of Exam: Online

SYLLABUS

- For 2nd Year students
  (Maths & Aptitude paper)
- For 3rd/4th/Passout students
  (Technical paper)

Scan QR Code
for registration and details

10% DISCOUNT
(for Registered Students)

REGISTRATION

- **ACE Online**
  (Deep Learn)
- **Classroom Coaching**
- **Online Live**

APPLICABLE

ALLOCATION OF SCHOLARSHIPS

75%	60%	50%	30%	20%
1st Position	2nd Position	3rd Position	4th Position	5th Position
(50 Members)	(100 Members)	(250 Members)	(400 Members)	(700 Members)

- For attaining scholarships, the above positions have to achieve a minimum of 40% marks.
- Applicable for batches commencing between March - June 2022

*Fee Waiver

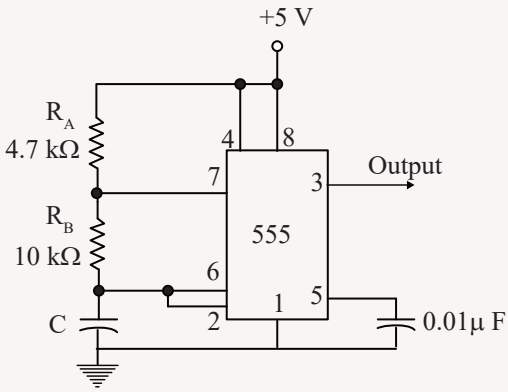
Last Date to apply: 4th March 2022

Fee: Rs.100/- only

040-23234418/19/20

support@aceenggacademy.com

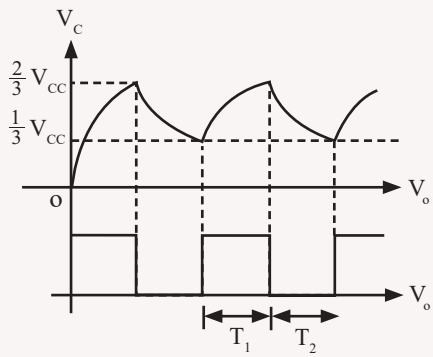
09. What are the approximate values of t_1, t_2, frequency and duty cycle of a 555 timer used as an astable multivibrator respectively? (Take C = 680 pF)



(a) 4.76 μsec, 6.997 usec, 85 kHz and bit 59.5%
(b) 6.84 nsec, 9.997 nsec, 68 kHz and 59.5%
(c) 4.76 μsec, 6.997 usec, 68 kHz and 68%
(d) 6.84 nsec, 9.997 nsec, 85 kHz and 68%

09. Ans: (a)

Sol:



$T_1 = 0.693(R_A + R_B)C$

$= 0.693(4.7K + 10K)680PF$

$= 6.92\ \mu s$

$T_2 = 0.693(R_B)C$

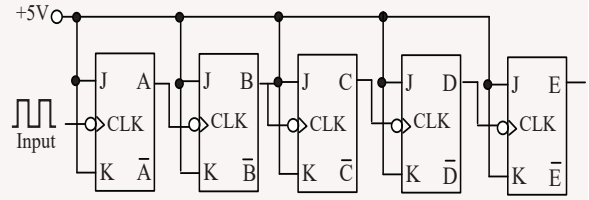
$= 0.693(10K)(680PF)$

$= 4.7\ \mu sec$

$$f = \frac{1}{T} = \frac{1}{T_1 + T_2} = 85\ kHz$$

$$\text{Duty cycle} = \frac{T_{ON}}{T} = \frac{T_1}{T_1 + T_2} = 59.5\%$$

10. A five-bit asynchronous counter is shown in the figure. If the clock input frequency is 22.4 MHz, what is the frequency at the output E?



(a) 700 kHz (b) 350 kHz
(c) 150 MHz (d) 300 MHz

10. Ans: (a)

Sol: Frequency at

$$E = \frac{f_{CLK}}{2^n} = \frac{f_{CLK}}{2^5}$$

$$= \frac{22.4\ MHz}{32} = 0.7MHz = 700kHz$$

11. A certain J-K flip-flop has propagation delay 12 picoseconds. What is the largest MOD of a counter that can be constructed from these J-K flip-flops and operates up to 10 GHz?

(a) 64 (b) 128
(c) 256 (d) 512

11. Ans: (c)

Sol: Given, Max frequency of operation = 10GHz

FF propagation delay $t_{pd,\,FF} = 12ns$

$$f_{max} = \frac{1}{N.t_{pd,FF}}$$

$$\Rightarrow 10 \times 10^9 = \frac{1}{(N)(12 \times 10^{-12})}$$

$$\Rightarrow N = \frac{1}{120 \times 10^9 \times 10^{-12}}$$

$$\Rightarrow N = \frac{1000}{120} = 8.33$$

Considering N = 8 FFs.

$$\text{then } f_{max} = \frac{1}{8 \times 12 \times 10^{-12}} = \frac{1000}{96} \times 10^9$$

$$f_{max} = 1.04 \times 10^{10} = 10.4\ GHz$$

Note: If N = 9 ; $f_{max} = 9.259$ GHz, which does not matches with given requirement.

So, Maximum modulus = $2^8 = 256$.

12. Simplify the following Boolean expression using the De Morgan's theorem:
$f(A,B,C,D,E,F) = \overline{(A+B)\overline{C}\,\overline{D}+(E+\overline{F})}$
(a) $(\overline{A}+\overline{B}+\overline{C})(\overline{D}+\overline{E}+\overline{F})$
(b) $A\overline{B}+\overline{C}D+EF$
(c) $(\overline{A}\,\overline{B}+C+D)\overline{E}F$
(d) $\overline{ABC+DEF}$

12. Ans: (c)

Sol: $f(A,B,C,D,E,F) = \overline{(A+B)\overline{C}\,\overline{D}+(E+\overline{F})}$
$= \overline{(A+B)\overline{C}\,\overline{D}}.\overline{E+\overline{F}}$
$= \overline{A+B}+\overline{\overline{C}}+\overline{\overline{D}}.\overline{\overline{E}}.\overline{\overline{F}}$
$= (\overline{A}\,\overline{B}+C+D)\overline{E}F$

13. The internet protocol (IP) (RFC 791) is the heart of the TCP/IP protocol suite, It corresponds to the network layer in the OSI reference model and provides
(a) a connectionless service to the application layer which requires a virtual circuit
(b) high reliability in packet delivery
(c) a connectionless best effort delivery service to the transport layer
(d) reliability functions within a higher layer protocol

13. Ans: (c)

Sol: Network layer provides a connection less best effort delivery service to the transport layer.
Hence option (c) is correct.

14. The orbital satellites are
(a) symmetrical (b) asymmetrical
(c) synchronous (d) nonsynchronous

14. Ans: (c)

Sol: The orbital satellites are synchronous

15. The requirement for reliability, long life, stability, high efficiency and suitability for space environment are met by the use of
(a) IF amplifier
(b) RF amplifier
(c) travelling wave tube amplifier
(d) ultrasonic amplifier

15. Ans: (c)

Sol: The requirement for reliability, long life, stability, high efficiency and suitability for space environment are met by the use of travelling wave tube amplifier.

16. The measurement precision of an Instrument defines the smallest change In measured quantity that can be observed, which is called
(a) accuracy of the instrument
(b) precision of the instrument
(c) resolution of the instrument
(d) significant figure of the instrument

16. Ans: (c)

Sol: The smallest change in measured quantity that can be observed is called as resolution of the instrument.

17. Consider the following statements :
1. The caesium beam and the hydrogen maser are the primary or absolute standards.
2. The rubidium vapour standard is based on the hyperfine transition in rubidium-78 gas, between the states F = 2 and F = 1.
3. The secondary standard of e.m.f. is the unsaturated Weston cell.

Which of the above statements are correct?
(a) 1 and 2 only
(b) 1 and 3 only
(c) 1, 2 and 3
(d) 2 and 3 only

17. Ans: (c)

Sol: Caesium beam & hydrogen maser are the primary standards.
The rubidium vapour standard is based on the hyper transition in rubidium gas between the states F = 2 & F = 1.
Also the unsaturated weston cell is used as the secondary standard of emf.

ACE ONLINE

Pre-Recorded Classes

CE | ME | EE | EC | CS | IN | PI

www.ace.online

For **ESE I GATE I PSUs I SSC-JE** curated by India's best minds. Access courses through Mobile / Tablet / Laptop / Desktop from anywhere. We have subscription options of 1 | 3 | 6 | 12 | 18 & 24 months.

COURSE DETAILS

- GATE + PSUs (650+ Hours) (English)
- GATE + PSUs (650+ Hours) (Hinglish)
- ESE: General Studies (250+ Hours)
- ESE + GATE + PSUs (1000+ Hours)
- SSC-JE : Technical (CE) (400+ Hours)
- SSC-JE : GS (200+ Hours)
- APPSC / TSPSC-AEE: Tech. (CE) (500+ Hours)
- APPSC / TSPSC-AEE/AE: GS (350+ Hours)
- GENCO / TRANSCO / DISCOMs: EE (550+ Hrs)
- APPSC-AE (Technical Paper-II) (100+ Hours)
- Quick Revision Course: CSE (250+ Hours)
- PYQS of GATE & ISRO Exams: CSE (150+ Hrs)
- KPTCL-AE: EE Technical (550+ Hrs)

SALIENT FEATURES

Experienced Faculty

Free Online Test Series

Live Doubt clearance

Learning with 2d & 3d animations

Preparation Strategy

Self Assessment Tests

ASK AN EXPERT

Free Interview Guidance

Full set of Study Material

EMI option Available

Our Courses are Available on

▸ IOS (Mobile/Tab), ▸ Android (Mobile/Tab), ▸ Windows (Laptop/Desktop)

Download on the App Store | GET IT ON Google Play | Get it from Microsoft

www.ace.online help@ace.online

Call: 040-23234418/19/20 | Email: help@ace.online

18. Which one of the following statements is correct regarding standards of measurements?
(a) The primary standards are as accurate as the international standards.
(b) The secondary standards are preserved at the 'International Bureau of Weights and Measures' and not available to the ordinary users.
(c) The secondary standards are the absolute standards and not as accurate as the international standards.
(d) Working standards are used by manufacturers for comparing and standardizing their products.

18. Ans: (a)

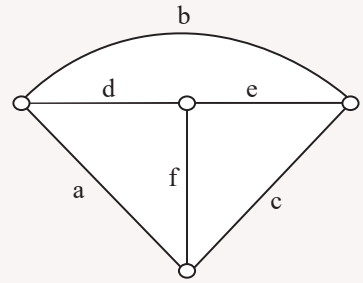
Sol: The primary standards are as accurate as the international standards.

19. A path is a particular subgraph consisting of an ordered sequence of branches having which of the following properties?
1. At all but two of its nodes, called internal nodes, there are incident exactly two branches of the subgraph.
2. At each of the remaining two nodes, called terminal nodes, there is incident exactly one branch of the subgraph.

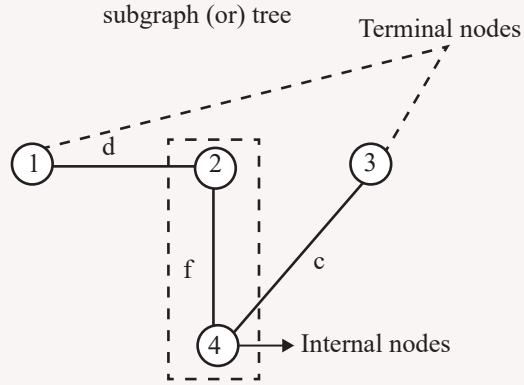
Select the correct answer using the code given below.
(a) 1 only
(b) 2 only
(c) Neither 1 nor 2
(d) Both 1 and 2

19. Ans: (d)

Sol: 1. At all but two of its nodes, called internal nodes, there are incident exactly two branches of the subgraph.



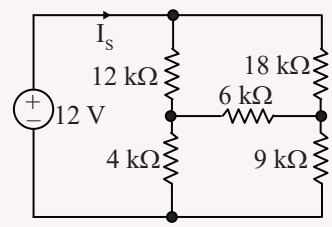
subgraph (or) tree



(2) & (4) are internal nodes which are incident exactly two branches
(2) → d, f
(4) → c, f

2. At each of the remaining two nodes called terminal nodes (1), (3) there is incident exactly one branch
(1) → d
(3) → c

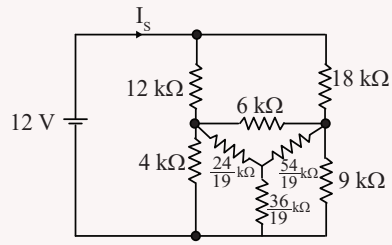
20. What is the value of the source current (I_s) of the given network in the figure?

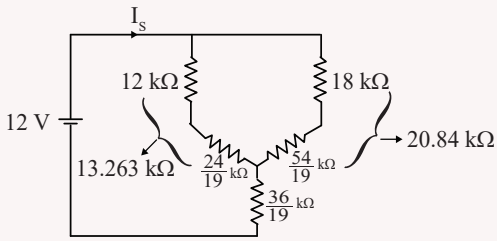


(a) 1.2 A (b) 12 A
(c) 1.2 mA (d) 12 mA

20. Ans: (a)

Sol:





$$8.1 + \frac{36}{19} = 10\ \Omega$$

$$I_S = \frac{12}{10} = 1.2\ A$$

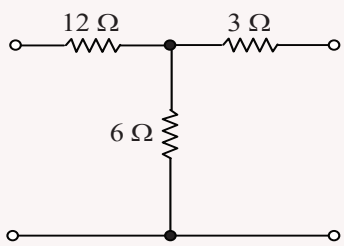
21. Which of the following properties of the circuits of a graph are correct?
    1. The minimum number of branches possible in a circuit will be equal to the number of nodes or vertices.
    2. There are exactly two paths between any pair of vertices in a circuit.
    3. There are at least two branches in a circuit.

    Select the correct answer using the code given below.

    (a) 1 and 2 only (b) 1 and 3 only
    (c) 2 and 3 only (d) 1, 2 and 3

21. Ans: (b)

22. What are the open-circuit reverse voltage gain and the short-circuit forward current gain respectively for the two-port network shown in the figure?



(a) $\frac{1}{3}$ and $-\frac{1}{3}$

(b) $-\frac{1}{3}$ and $\frac{1}{3}$

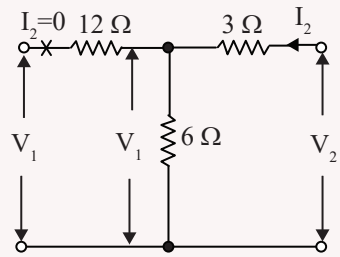
(c) $\frac{2}{3}$ and $-\frac{2}{3}$

(d) $-\frac{2}{3}$ and $\frac{2}{3}$

22. Ans: (c)

Sol: Open-circuit reverse voltage gain

$$h_{12} = \left.\frac{V_1}{V_2}\right|_{I_1 = 0}$$



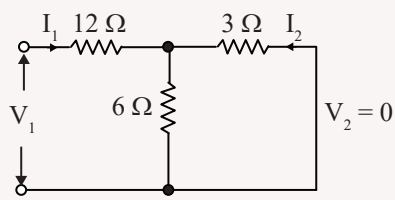
By Voltage division rule,

$$V_1 = \frac{V_2(6)}{6+3}$$

$$h_{12} = \frac{V_1}{V_2} = \frac{6}{9} = \frac{2}{3}$$

Short-circuit forward current gain

$$h_{21} = \left.\frac{I_2}{I_1}\right|_{V_2 = 0}$$

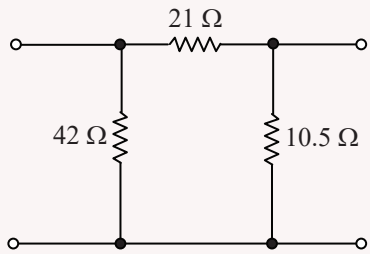


By Current division rule

$$I_2 = \frac{-I_1 \times 6}{6+3} = -I_1\left(\frac{2}{3}\right)$$

$$h_{21} = \frac{I_2}{I_1} = \frac{-2}{3}$$

23. What are the open-circuit transfer admittance and the negative short-circuit current ratio respectively for the two-port network shown in the figure?

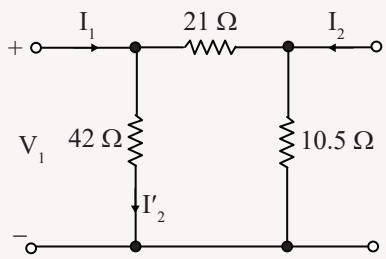


(a) $\frac{2}{3}$S and $\frac{3}{2}$ (b) $\frac{1}{6}$S and $\frac{3}{2}$

(c) $\frac{1}{6}$S and $\frac{2}{3}$ (d) $\frac{2}{3}$S and $\frac{2}{3}$

23. Ans: (c)

Sol:



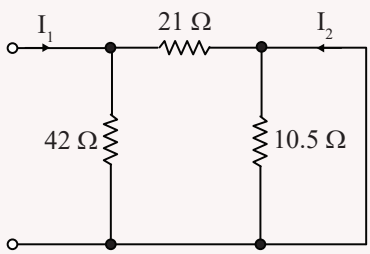
Open-Circuit Transfer admittance

$$Y_{21} = \frac{I_2}{V_1}$$

$$I'_2 = \frac{I_2 \times 10.5}{10.5 + 21 + 42}$$

$$V_1 = 42\, I'_2 = \frac{I_2\, 42 \times 10.5}{10.5 + 21 + 42} = 6$$

$$\frac{I_2}{V_1} = \frac{1}{6}\text{S}$$



Negative Short-Circuit Current ratio

$$-I_2 = \frac{I_1 \times 42}{42 + 21} = \frac{2}{3} I_1$$

$$-\frac{I_2}{I_1} = \frac{2}{3}$$

24. The dynamics of an nth order single-input single-output system can be written by the vector-matrix differential equation $\dot{x} = Ax + Bu$ and output $y = Cx$. What is the size of the output coupling matrix C?

(a) n × n (b) n × 1

(c) 1 × n (d) 1 × 1

24. Ans: (c)

25. For the state variable formulation of R-L-C network, which one of the following statements is correct?

(a) The voltage across the inductor and the current through the capacitor are chosen as the state variables.

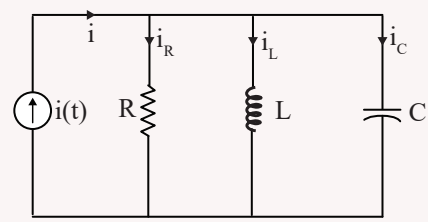
(b) Only the current through the inductor is chosen as the state variable.

(c) Only the voltage across the capacitor is chosen as the state variable.

(d) The current through the inductor the and the voltage across capacitor are chosen as the state variables.

25. Ans: (d)

26. If $i(t) = I_0 \sin \omega t$, then the state variable formulation of the R-L-C circuit shown in the figure is



(a) $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & 1\\ -1/LC & -1/RC\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ I_0(\omega/C)\cos\omega t\end{bmatrix}$

(b) $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & 1\\ 1/LC & 1/RC\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ I_0(\omega/C)\sin\omega t\end{bmatrix}$

(c) $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & 1\\ 1/LC & 1/RC\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ I_0(\omega/C)\cos\omega t\end{bmatrix}$

(d) $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & 1\\ -1/LC & -1/RC\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ I_0(\omega/C)\sin\omega t\end{bmatrix}$

EXCLUSIVE ONLINE

LIVE CLASSES

ESE | GATE | PSUs - 2023 / 2024

CE | ME | EE | EC | CS | IN | PI

ENGLISH MODE

REGULAR BATCHES

26th FEB-2022	13th MAR-2022	27th MAR-2022
11th APR-2022	25th APR-2022	08th & 22nd MAY
11th JUN-2022		

COURSE DETAILS

- For ESE+GATE+PSUs Students

(1). Online Live Classes (Technical Subjects

(2). Recorded Classes (General Studies & ESE Addl. Subjects) on ACE Online (Pre-Recorded Videos)

- Recorded version of the Online Live Class will be made available through out the course with 3 times views
- Doubt clearing sessions and tests to be conducted regularly
- Free Study Material (Hard Copies)
- Morning Batch (6 am - 8 am)
- Evening Batch (8 pm - 10 pm)
- Regular Batches (4 - 6 Hours on Weekdays, 6 - 7 Hours on Sundays and Public Holidays)
- Access the lectures from anywhere

FEATURES

- Experienced Faculty
- Doubt Clearance
- Replica of Classroom
- Structured Course
- Backup Classes

DISCOUNTS

25% OFF for ACE Old Students

20% OFF for IIT/NIT Students

15% OFF for IIIT/Govt. College

10% OFF - EARLY BIRD OFFER

TIll: 28th FEB

Scan QR Code to Enroll

26. Ans: (*)

Sol: $i = i_R + i_L + i_C$

$$I_0 \sin \omega t = \frac{x_2}{R} + x_1 + C\dot{x}_2$$

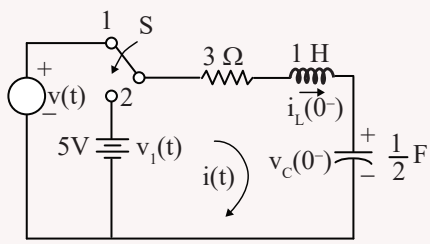
$$\dot{x}_2 = \frac{I_0}{C}\sin \omega t - \frac{x_1}{C} - \frac{x_2}{RC}$$

$$x_2 = L\dot{x}_1$$

$$\dot{x}_1 = \frac{1}{L}x_2$$

$$\begin{bmatrix}\dot{x}_1 \\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & \frac{1}{L} \\ -\frac{1}{C} & -\frac{1}{RC}\end{bmatrix}\begin{bmatrix}x_1 \\ x_2\end{bmatrix} + \begin{bmatrix}0 \\ \frac{I_0}{C}\sin \omega t\end{bmatrix}$$

27. In the figure, the switch is thrown from position 1 to 2 at time t = 0. Just before the switch is thrown, the initial conditions are $i_L(0^-) = 2$ A, $v_c(0^-) = 2$ V. What is the current i(t) after switching action?

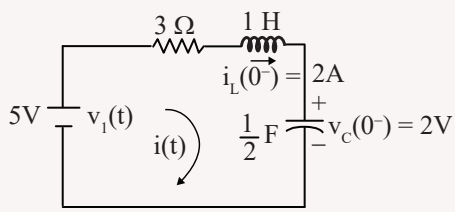


(a) $e^{-t} + e^{-3t}$ (b) $e^{-t} + e^{-2t}$

(c) $e^{t} + e^{3t}$ (d) $e^{t} + e^{2t}$

27. Ans: (b)

Sol:



$$5 = 3i + 1\frac{di}{dt} + \frac{1}{C}\int_0^t i(t)\,dt + 2V$$

$$0 = 3\frac{di}{dt} + \frac{d^2i}{dt^2} + \frac{i}{C}$$

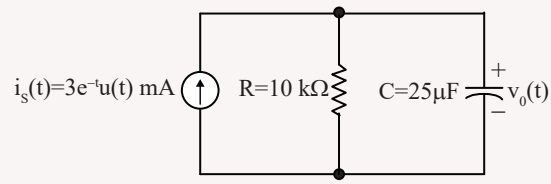
$$(D^2 + 3D + 2)i = 0$$

$$\frac{-3 \pm \sqrt{9-8}}{2} = \frac{-3 \pm 1}{2}$$

$$\frac{-3+1}{2} = \frac{-2}{2} = -1$$

$$\frac{-3-1}{2} = \frac{-4}{2} = -2$$

28. What is the output voltage $v_0(t)$ of the circuit shown in the figure?



(a) $v_0(t) = 20(e^{-t} - e^{-2t})u(t)V$

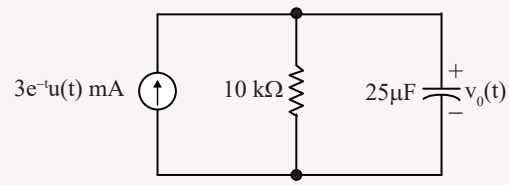
(b) $v_0(t) = 40(e^{-t} - e^{-2t})u(t)V$

(c) $v_0(t) = 40(e^{-t} - e^{-4t})u(t)V$

(d) $v_0(t) = 20(e^{-t} - e^{-4t})u(t)V$

28. Ans: (c)

Sol:



$$\tau = RC = 10k \times 25 \times 10^{-6}$$

$$\tau = 250 \times 10^{-3}$$

$$\frac{1}{\tau} = 4$$

$$3e^{-t}\text{mA} = \frac{v_0}{10k} + 25 \times 10^{-6}\frac{dv_0}{dt}$$

$$D + \frac{v_0}{10 \times 10^3 \times 25 \times 10^{-6}} = \frac{3 \times 10^{-3}}{25 \times 10^{-6}}e^{-t}$$

$$\left(D + \frac{1}{250 \times 10^{-3}}\right)v_0 = 0.12 \times 10^3 = 120$$

$$(D+4)v_0 = 120e^{-t}$$

$$\frac{dv_0}{dt} + 4v_0 = 120e^{-t}$$

$$sv_0(s) + 4v_0(s) = \frac{120}{s+1}$$

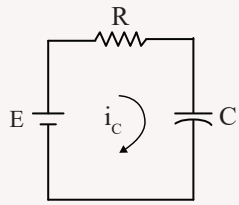
$$v_0(s)[s+4] = \frac{120}{(s+1)(s+4)} = \frac{A}{s+1} + \frac{B}{s+4}$$

$$A = \frac{120}{s+4}\Big|_{s=-1} = \frac{120}{3} = 40$$

$$B = \frac{120}{s+1}\Big|_{s=-4} = \frac{120}{-4+1} = -40$$

$$v_0(t) = 40[e^{-t} - e^{-4t}]u(t)V$$

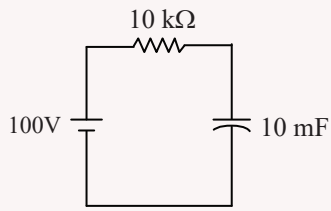
29. If the value of E = 100 V, R = 10kΩ and C = 10mF in the circuit shown in the figure, then the capacitor current (i_C) a t = 150 ms is



(a) $100e^{-1.5}$ mA (b) $50e^{-1.5}$ mA
(c) $10e^{-1.5}$ mA (d) $20e^{-1.5}$ mA

29. Ans: (c)

Sol:



$i_c(t = 15ms)$

$i(0^+) = \frac{100}{10k} = 10$ mA

$i(\infty) = 0$

$\tau = RC = 10k \times 10m = 100$

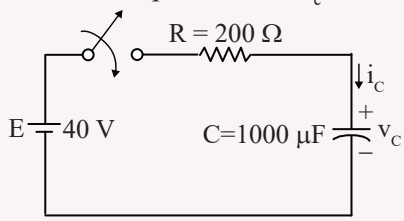
$\frac{1}{\tau} = \frac{1}{100}$

$i(t) = 10me^{-\frac{t}{100}}$

$i(t) = 10 \times 10^{-3} \times e^{-\frac{1}{100} \times 150 \times 10^{-3}}$

$i(t) = 10 \times 10^{-3} \times e^{-1.5 \times 10^{-3}} = 10\, e^{-1.5}$ mA

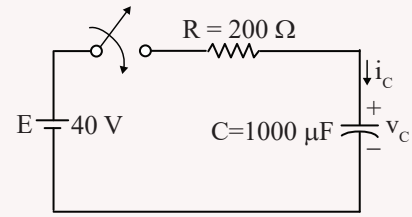
30. The capacitor of the figure shown below has 25 V on it with polarity shown at the time the switch is closed. The expression for v_c is



(a) $(40 - 15e^{-5t})$ volts (b) $(40 - 20e^{-5t})$ volts
(c) $(40 - 25e^{-3t})$ volts (d) $(40 - 40e^{-3t})$ volts

30. Ans: (a)

Sol:



$v_c(0^-) = 25V$

$v_c(0^+) = 25V$

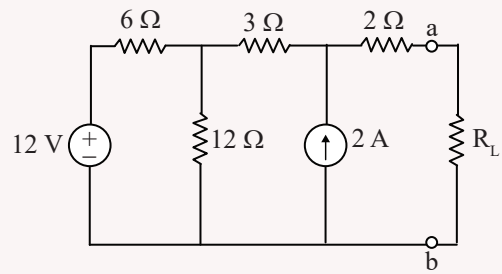
$v_c(\infty) = 40$

$\tau = RC = 200 \times 1000 \times 10^{-6} = 0.2s$

$\frac{1}{\tau} = 5$

$v_c(t) = 40 + (25 - 40)e^{-5t} = (40 - 15e^{-5t})$ volts

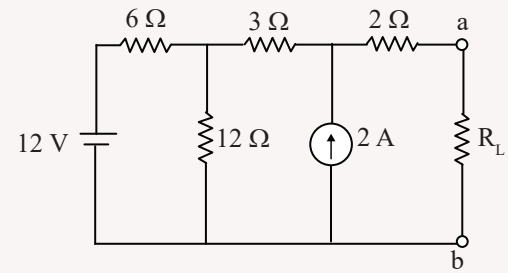
31. What is the value of the maximum power transferred to the load resistor R_L in the given circuit?



(a) 11.43 W (b) 12.43 W
(c) 13.44 W (d) 14.44 W

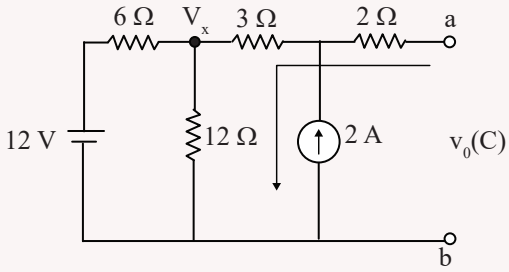
31. Ans: (c)

Sol:



$R_{TH} = (6//12) + 3 + 2$

$R_{TH} = \frac{72}{18} + 5 = 9$



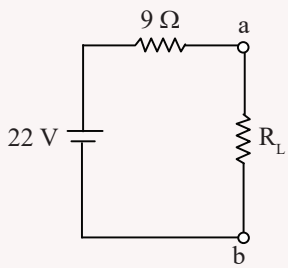
$$\frac{2}{1} = \frac{v_x}{12} + \frac{v_x - 12}{6}$$

$$24 = v_x + 2v_x - 24$$

$$3v_x = 48$$

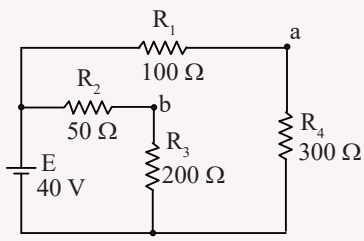
$$v_x = 16$$

$$v_0(C) = 3 \times 2 + v_x = 6 + 16 = 22$$



$$P_{max} = \frac{v_s^2}{4 \times 9} = \frac{(22)^2}{36} = 13.44 \text{ W}$$

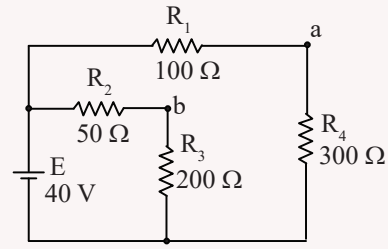
32. In the figure given below, the value of voltage drop across the resistor R_1 is



(a) 100 V (b) 10 V
(c) 1 V (d) 0.1 V

32. Ans: (b)

Sol:



Voltage drop across R_1 is $40 \times \frac{100}{400} = 10V$

33. Which one of the following is a merit of nuclear power plant?
(a) Large quantity of fuel storage facility is required in nuclear power plant
(b) The maintenance cost of hydro plants is very low as compared to that of steam and nuclear plants
(c) As compared to thermal plant, the space required for nuclear power plant is less
(d) The initial cost of nuclear power plant is higher as compared to that of the other types of power plants

33. Ans: (c)

Sol: Nuclear power plant requires less space compared thermal power plant.

34. Which one of the following is not a part of the nuclear reactor?
(a) Moderator (b) Biological shield
(c) Economizer (d) Reflector

34. Ans: (c)

Sol: Economizer is used in thermal power plant to heat the feed water moderator, biological shield and reflector are used in Nuclear power plant.

35. The efficiency of a nuclear plant is
(a) 48% (b) 35%
(c) greater than 50% (d) less than 30%

35. Ans: (b)

Sol: The efficiency of Nuclear plant is generally 34 - 39%.

CLASSROOM COACHING

@ HYDERABAD

CE | ME | EC | EE | CS | PI | IN

ESE | GATE | PSUs - 2023/2024

- **College Goers Batch:**
  - 26th Feb-2022

@ ABIDS
@ KUKATPALLY
@ KOTHAPET

- **Regular Batches:**

26th Feb-2022	13th Mar-2022	27th Mar-2022
11th Apr-2022	25th Apr-2022	08th May-2022
22nd May-2022	11th Jun-2022	

- **Spark Batches:**

8th May-2022	22nd May-2022	11th Jun-2022

- **Summer Short-Term Batches:**

8th May-2022	22nd May-2022	11th Jun-2022

DISCOUNTS

10% OFF | **EARLY BIRD OFFER** valid till 28th FEB-2022

50% OFF | **ACE OLD STUDENTS**

H.O. # 4-1-1236/1/A, Sindhu Sadan, King Koti, Abids, Hyderabad – 500001, Telangana, India.

36. The voltage induced in a coil by a changing flux will be of such a polarity that if a current could flow as a result of that induced voltage, the flux established by that current would oppose the causing or original flux change. It is known as
(a) Faraday's law
(b) Lenz's law
(c) Biot-Savart law
(d) Ampere's circuital law

36. Ans: (b)

Sol: Lenz's law states that, "The resultant always oppose the main cause producing".

37. The measure of a coil's ability to produce flux is called
(a) electromotive force
(b) magnetic lines of force
(c) magnetomotive force
(d) magnetism

37. Ans: (c)

Sol: The measure of a coils ability to produce flux is called "magneto motive force".

38. Which one of the following temperatures exists for the magnetic moments of a ferromagnetic material which become sufficiently diverse in orientation that the material becomes nonmagnetic?
(a) Room temperature
(b) Absolute temperature
(c) Curie temperature
(d) Ambient temperature

38. Ans: (c)

39. Which one of the following statements is correct regarding Leclanche cell?
(a) The resulting cell voltage for Leclanche cell is 3.5 V.
(b) Zinc powder acts as cathode in Leclanche cell.
(c) Manganese dioxide acts as anode in Leclanche cell.
(d) A coal/manganese dioxide cathode, a zinc anode and ammonium chloride solution as electrolyte are used in Leclanche cell.

39. Ans: (d)

Sol: In Leclanch cell, the resulting voltage is 1.5V. Zinc acts as anode and manganese dioxide acts as cathode.

40. Which one of the following statements is not correct regarding carrier lifetime in semiconductors?
(a) Carrier lifetime ranges from nanoseconds to hundreds of microseconds.
(b) On an average, a hole (an electron) will exist for τ_p sec before recombination.
(c) τ_n is the time, it takes the total concentration to fall to approximately 63% of its initial value.
(d) τ_p is the time, it takes the injected concentration to fall to approximately 37% of its initial value.

40. Ans: (c)

Sol: $\delta n = \Delta n\, e^{-t/\tau_n}, \Delta n = \delta n|_{t=0}$

$\delta p = \Delta p\, e^{-t/\tau_p}, \Delta p = \delta p|_{t=0}$

If $t = \tau_n \Rightarrow \delta_n = \frac{1}{e}\Delta n = 37\%\Delta n$

If $t = \tau_p \Rightarrow \delta_p = \frac{1}{e}\Delta p = 37\%\Delta p$

41. At what condition does the Fermi energy level (E_F) lie exactly between the band gap for intrinsic semiconductor?
(a) The effective masses of a hole and a free electron are the same
(b) The effective mass of a free electron is less than the effective mass of a hole
(c) The effective mass of a free electron is greater than the effective mass of a hole
(d) The effective mass of a hole is always in the centre of the forbidden energy band

41. Ans: (a)

Sol: $E_F = \frac{E_c + E_v}{2} - \frac{KT}{2}\ell n\left(\frac{N_C}{N_V}\right)$

$E_F = E_{midband} - \frac{3KT}{4}\ell n\left(\frac{m_n^*}{m_p^*}\right)$

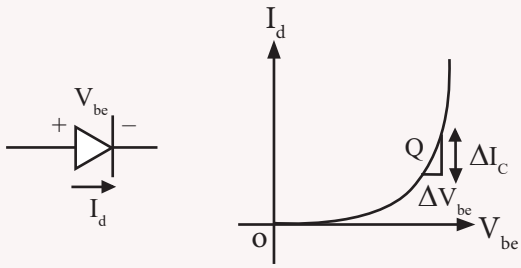
$m_n^* = m_p^*$

$\Rightarrow E_F = E_{midband}$

42. In resistance levels, the AC or the dynamic resistance of a p-n junction diode is defined by
(a) a point on the characteristics
(b) a tangent line at the Q-point in graphical determination
(c) the straight line between limits of operation
(d) the ratio of current through load to voltage across load

42. Ans: (b)

Sol:



Dynamic resistance

$$(r_d) = \frac{\Delta V_{be}}{\Delta I_C}$$

This can be calculated from a tangent line at the Q point.

43. Consider the following statements regarding comparison of FET with BJT :
1. BJT is less noisy than FET.
2. FET is current-controlled device, whereas BJT is voltage-controlled device.
3. FETs are more temperature stable compared to BJTs.
4. FETs are simple to fabricate and occupy less area on the single chip.

Which of the above statements are correct?
(a) 1 and 2 (b) 1 and 3
(c) 3 and 4 (d) 1 and 4

43. Ans: (c)

Sol: → BJT is more noisy than FET
→ FET is voltage controlled device and BJT is current controlled device.

44. Which one of the following is correct regarding stability factor with standard notations?
(a) $S(I_{CO}) = \frac{\Delta I_C}{\Delta I_{CO}}$ (b) $S(I_{CO}) = \frac{\Delta I_{CO}}{\Delta I_C}$
(c) $S(V_{BE}) = \frac{\Delta I_C}{\Delta I_{CO}}$ (d) $S(V_{BE}) = \frac{\Delta I_C}{\Delta \beta}$

44. Ans: (a)

Sol: The stability factor $S(I_{CO})$ is given as $S(I_{CO}) = \frac{\partial I_C}{\partial I_{CO}}$

$I_C = \beta I_B + (\beta + 1) I_{CO}$

Differentiate w.r.t I_C

$$\rightarrow 1 = \beta \frac{\partial I_B}{\partial I_C} + (\beta + 1)\frac{\partial I_{CO}}{\partial I_C}$$

$$\therefore \boxed{S = \frac{\partial I_C}{\partial I_{CO}} = \frac{1+\beta}{1-\beta\left[\frac{\partial I_B}{\partial I_C}\right]}}$$

45. Which one of the following is a transfer characteristic of NMOS with standard notations?
(a) $I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_P}\right)^2$ (b) $I_D = I_{DSS}\left(1 - \frac{V_P}{V_{GS}}\right)^2$
(c) $I_D = k(V_{GS} - V_T)^2$ (d) $I_D = k(V_T + V_{GS})^2$

45. Ans: (c)

46. The atomic packing factor of a simple cubic structure is
(a) 0.42 (b) 0.62
(c) 0.52 (d) 0.72

46. Ans: (c)

Sol: APF simple cubic structure is 0.52.

47. For some solid materials, each atom possesses a permanent dipole moment by
(a) virtue of incomplete cancellation of electron spin and/or orbital magnetic moments
(b) rotation and alignation with external field
(c) the presence of external field
(d) rotation in opposite direction with external field

47. Ans: (a)

Sol: Permanent dipolemoment is generated by virtue of incomplete cancellation of electron spin and orbital magnetic moments.

48. Which one of the following statements is not correct regarding laminates?
(a) Paper reinforced laminates can be used in thickness ranging between 0.2 mm and 50 mm.
(b) Paper reinforced laminates are used in applications involving power frequencies and voltages up to 1 kV.
(c) Glass reinforced laminates make use of phenol formaldehyde as impregnant and adhesive.
(d) Asbestos reinforced laminates have higher electrical characteristics than paper reinforced laminates.

48. Ans: (b)

49. Which one of the following statements is not correct regarding mercury?
(a) Mercury is a heavy silver white metal.
(b) The specific weight of mercury is approximately 31.55 gm/cm^3.
(c) Mercury is the only metal which is liquid at room temperature.
(d) The boiling point of mercury is approximately 357° C.

49. Ans: (b)

50. What is the value of interplanar spacing for (2 3 1) plane of an FCC structure whose atomic radius is 0.125 nm?
(a) $d_{231} = 0.443$ nm
(b) $d_{231} = 0.343$ nm
(c) $d_{231} = 0.094$ nm
(d) $d_{231} = 0.194$ nm

50. Ans: (c)

Sol: Interplanar spacing $= d = \frac{a}{\sqrt{h^2 + k^2 + \ell^2}}$

For FCC structure

$$a = \frac{4R}{\sqrt{2}} = 2\sqrt{2}\,R$$

$$= 2\sqrt{2} \times 0.125$$

$$= 0.3535$$

$$d = \frac{0.3535}{\sqrt{2^2 + 3^2 + 1^2}} = \frac{0.3535}{\sqrt{4 + 9 + 1}} = \frac{0.3535}{\sqrt{14}}$$

$$= 0.0944$$

51. When a bar is subjected to a rapidly alternating magnetic field, there is rapid extension and contraction in the length of the bar. This phenomenon is known as
(a) hysteresis
(b) saturation magnetization
(c) magnetostriction
(d) diamagnetism

51. Ans: (c)

Sol: **Magnetostriction:** It is the ability of material that can generate mechanical strains by applying magnetic field.

52. The material composed of C_{60} molecule that contains sixty carbon atoms in a network of sp^2 bonding which forms a spherical structure, is known as
(a) buckminsterfullerene (b) haeckelite
(c) carbon nanocone (d) carbon nanotube

52. Ans: (a)

Sol: Fullerence is C_{60} nanomaterial and it is a zero dimensional material.

53. The electronic properties of the nanotubes could be changed between metallic and semiconducting simply by varying
(a) the tube length (b) the tube diameter
(c) the tube perimeter (d) the tube width

53. Ans: (b)

Sol: Electronic properties could be changed between metallic and semiconductors simply by varying the tube diameter (n) its helicity i.e., by changing the value of n and m.

54. A very low temperature, where resistivity of certain materials abruptly plunges from a finite value to one that is virtually zero and remains there upon further cooling, is called
(a) knee temperature (b) ambient temperature
(c) critical temperature (d) Curie temperature

54. Ans: (c)

Sol: The resistive of material below critical temperature is a zero and this state is known as superconducting state Hg critical transition temperature is 4.2K.

Classroom Coaching
@ HYDERABAD & DELHI

For ESE MAINS (QPS & DC)

QUESTION PRACTICE SESSIONS WITH DOUBT CLEARING

Starts from:
12th MARCH 2022

TENTATIVELY CLASSES WILL START AFTER PRELIMS EXAM RESULTS

- Duration: **30 - 40 days**
- Class Timing: **5 - 6 hours** (daily)
- Fees: **Rs.10,000/-**

Streams: **E&T | EE | CE | ME**

Recorded sessions of all subjects with necessary theory will be given at free of cost till the date of the exam

FREE IF QUALIFIED IN PRELIMS

Free** for **ACE** present students of **ESE

support@aceenggacademy.com
040-23234418/19/20

KPTCL

Karnataka Power Transmission Corporation Limited

Assistant Engineer (AE)

Exclusive Online Live Batch

[TECHNICAL & GS]

for **EEE** Starts from: **12th FEB-2022**

for **CIVIL** Starts from: **21st FEB-2022**

10% DISCOUNT Early Bird Offer till 20th FEB

Rs. 2,000/- OFF for ACE old students

ACE Online (Pre-Recorded Classes)

EEE [TECHNICAL]

- Total No. of hours: **550+**
- **FREE** Online Test Series
- Live doubt clearance sessions

USE CODE:**KPTCL10**
get **10% Discount**

Online Test Series will starts from: **28th February 2022**

9341299966 | 040-23234418/19/20 www.aceenggacademy.com www.ace.online

55. Superconducting materials are used in which of the following applications?
1. Magnetic Resonance Imaging (MRI)
2. Magnetic Resonance Spectroscopy (MRS)
3. High-speed switching and signal transmission for computers
4. High-speed magnetically levitated trains

Select the correct answer using the code given below,

(a) 1 and 2 only (b) 3 and 4 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

55. Ans: (d)

Sol: Applications of superconductors:
(1) Loss less power transmission lines
(2) MRI scanning
(3) Switching circuits
(4) Nuclear power plants
(5) Mag-Lev trains

56. Consider the following statements:
1. Some materials are capable of absorbing energy then reemitting visible light in a phenomenon called luminescence.
2. If the delay time between absorption and reemission much less than one second, the phenomenon is termed as phosphorescence.
3. If the delay time between absorption and reemission is much greater than one second, the phenomenon is termed as fluorescence.

Which of the above statements is/are not correct?

(a) 1 only (b) 2 only
(c) 1 and 2 (d) 2 and 3

56. Ans: (d)

Sol: Production methods for carbon nanotubes
1. Arc discharge method
2. Laser vapourization method
3. Chemical vapor deposition
4. Ball milling

57. Which of the following are not the production methods for carbon nanotubes?
1. Electric arc discharge method
2. Laser vaporization method
3. Czochralski method
4. Metallization method

Select the correct answer using the code given below.

(a) 1 and 2 (b) 2 and 3 only
(c) 3 and 4 only (d) 2, 3 and 4

57. Ans: (c)

Sol: 3 and 4 only

58. Which one of the following statements is correct regarding induction motor?
(a) If the stator voltage is changed, the torque will not change.
(b) The motor has no starting torque.
(c) At high slip (speed), the torque is inversely proportional to square of the slip.
(d) At low slip (speed), the torque is directly proportional to the slip.

58. Ans: (d)

Sol: In Induction motor, the torque is directly proportional to slip, during low values of slips.

59. What is the coil pitch to eliminate the 5th harmonic in the induced e.m.f. of a synchronous generator?

(a) 36° (b) 180° (c) 144° (d) 160°

59. Ans: (a)

Sol: In order to eliminate 5th harmonic $\alpha = \frac{180}{5} = 36^\circ$

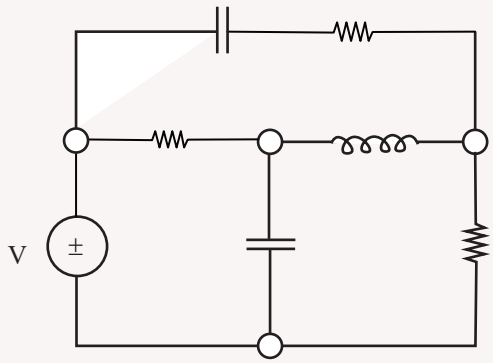
60. Which one of the following represents a single element such as a voltage source or a resistor?

(a) Branch (b) Node
(c) Loop (d) Circuit

60. Ans: (a)

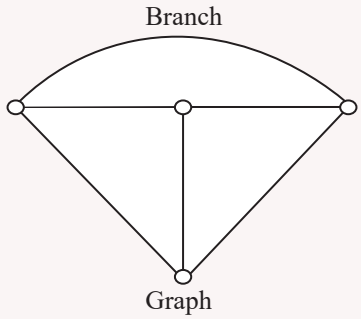
Sol: A voltage can be represent in graph theory equivalent as a branch and also R, L, C elements can be represent equivalent as a branch.

Electrical Network:



⇓

Graph:



61. Which one of the following statements is correct for n-channel or p-channel MOSFET?
(a) Drain resistance of MOSFET is very larger than JFET.
(b) Transconductance and inter-electrode capacitances have comparable values for the two types of devices.
(c) Input resistance and feedback resistance are very smaller than JFET.
(d) Input resistance and feedback resistance are comparable to JFET.

61. Ans: (b)

Sol: r_d (JFET) > r_d (MOSFET)

JFET → $I_G \simeq 0 \Rightarrow$ Hight input impedance

MOSFET → $I_G = 0 \Rightarrow$ Very high input impedance

62. Which one of the following statements is not correct for typical h-parameter values for a transistor?
(a) Input impedance is high in case of common emitter and common collector as compared to common base configuration.
(b) Output conductance is low in case of common emitter and common collector as compared to common base configuration.
(c) Reverse voltage gain is high in common collector as compared to common base and common emitter configuration.
(d) Current gain is positive for common emitter and negative for common collector and common base configuration.

62. Ans: (b)

Sol: Option a is correct as typically $h_{ib} = 30\Omega$

$h_{ie} = 1k\Omega$

$h_{ic} = 1k\Omega$

Option b is **wrong** as typically $h_{ob} = 8 \times 10^{-7}$

$h_{oe} = 12\ \mu$

$h_{oc} = 12\ \mu$

Option C is correct as typically $h_{rb} = 4 \times 10^{-6}$

$h_{re} = 10^{-4}$

$h_{rc} = 1$

Option d is correct as typically $h_{fb} = -0.99$

$h_{fe} = 100$

$h_{fc} = -101$

63. Which one of the following technologies consumes less power?
(a) Surface-mount technology (b) CMOS
(c) NMOS (d) PMOS

63. Ans: (b)

Sol: CMOS technology consumes less power.

64. Which one of the following requires additional process steps in their fabrication?
(a) Thin film resistor (b) Epitaxial resistor
(c) Pinched resistor (d) Junction resistor

GATE – 2023

Online Test Series

Starts from **15th April 2022**

No. of Tests: 54

+

Free 54 Practice Tests of GATE – 2022 Online Test Series

Total Tests: **108**

EC | EE | IN | CE | CS | ME | PI

Registrations Starts From **14th MARCH 2022**

Register on or Before **14th APRIL 2022**

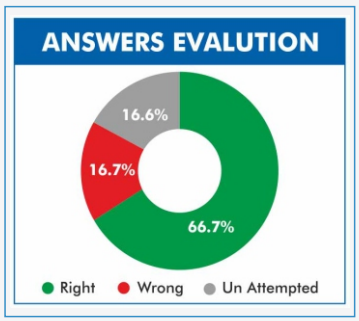
Get **20% DISCOUNT**

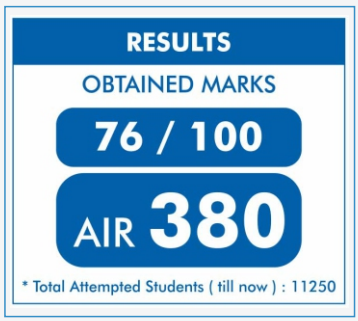
HIGHLIGHTS

- Detailed solutions are available.
- Video solutions are also available for difficult questions.
- All India rank will be given for each test.
- Comparison with all India toppers of ACE students.

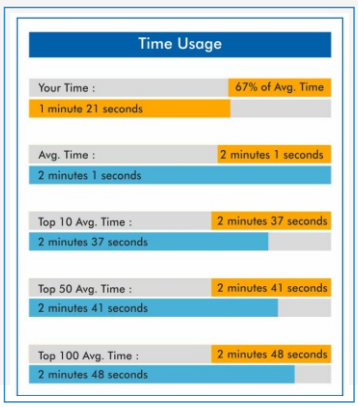
Note: Practice tests of **GATE 2022** Online Test Series will be available on **14th March, 2022**

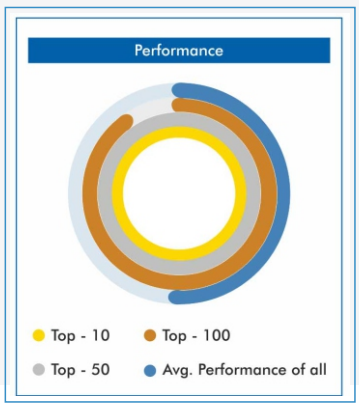
TEST WISE STATISTICS:

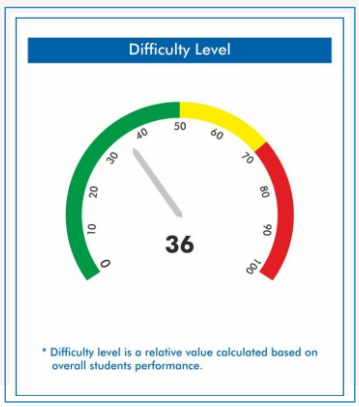




QUESTION WISE STATISTICS:







Phone No. : 040-48539866, 040-40136222 | Email : Testseries@aceenggacademy.com

64. Ans: (a)

Sol: Thin film resistor required additional processing step.
This is main disadvantage of thin film resistor fabrication.

65. In monolithic integrated circuits, the concentration of acceptor atoms in the region between isolation islands will be
(a) much higher than in the p-type substrate
(b) much lesser than in the p-type substrate
(c) equal to the p-type substrate
(d) not equal to the p-type substrate

65. Ans: (a)

Sol: Much higher then in the p-type substrate.
→ As isolation islands is used fan isolation
→ As the p-n is forward bias then to protect isolation island we make it highly dapping.

66. A circuit that amplifies the difference between two signals is called
(a) differential amplifier
(b) operational amplifier
(c) buffer
(d) level translator

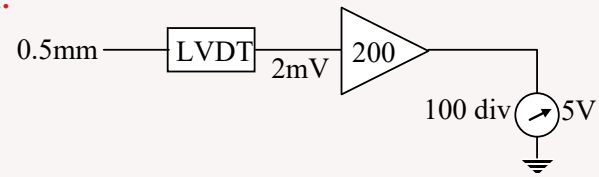
66. Ans: (a)

Sol: The main purpose of a differential amplifier is not just to amplify the difference but also to reject common signals.

67. The output of an LVDT is connected to a 5 V voltmeter through an amplifier whose amplification factor is 200. An output of 2 mV appears across the terminals of the LVDT when the core moves through a distance of 0.5 mm.
The milli-voltmeter scale has 100 divisions and scale can read to 1/5 of a division. The sensitivity and the resolution of the instrument are respectively
(a) 400 mV/mm and 2.25×10^{-3} mm
(b) 800 mV/mm and 2.25×10^{-3} mm
(c) 800 mV/mm and 1.25×10^{-3} mm
(d) 400 mV/mm and 1.25×10^{-3} mm

67. Ans: (c)

Sol:



$$\text{Sensitivity of instrument} = \frac{2\text{mV}\times200}{0.5\text{mm}}$$

$$= 800\left(\frac{\text{mV}}{\text{mm}}\right)$$

$$\text{Resolution of instrument} = \frac{5\text{V}}{500}\times\frac{1}{800\left(\frac{\text{mV}}{\text{mm}}\right)}$$

$$= \frac{1}{80}\text{mm} = 1.25\times10^{-3}\,(\text{mm})$$

68. The coil of a recording ammeter is 65 mm long and 25 mm wide. The rated current of the coil is 10 mA. The flux density in the air gap is 0.0046 Wb/m^2.The damping constant is 0.008 N-m/rad-s^{-1}. The moment of inertia is 0.008 kg-m^2. The spring constant is 0.016 N-m/rad. The Coulomb friction is 0.2×10^{-6} N-m. The number of turns on the coil to produce a deflection of 100° at rated current is approximately
(a) 374582 (b) 471548
(c) 581548 (d) 675284

68. Ans: (a)

Sol: $T_c = T_d$

$K_c \times \theta = \text{BINA}$

$$0.016\times100\times\frac{\pi}{108^\circ} = 0.0046\times10\times10^{-3}\times N\times(65\times25)\times10^{-6}$$

$$N = 373582.18$$

69. Consider the following statements regarding data acquisition systems :
1. Digital data acquisition systems are used when wide frequency width is required.
2. Analog data acquisition systems are more complex than digital systems.
3. Digital data acquisition systems are used when the physical quantity being monitored has a narrow bandwidth.

Which of the above statements are not correct?
(a) 1 and 2 only (b) 1 and 3 only
(c) 1, 2 and 3 (d) 2 and 3 only

69. Ans: (a)

Sol: Digital DAS is used when physical quantity being monitored has a narrow BW(i.e., when the quantity varies slowly). Also actually digital DAS is more complex than Analog DAS.
So, not correct statements are (1) & (2)
So, correct option is (a).

70. Wave analyzer is also known as
(a) selective level meter (b) precision receiver
(c) modulation analyzer (d) audio analyzer

70. Ans: (a)

Sol: A wave analyzer is also known as selective level meter.

71. What is the displayed rise time (approximately) when a pulse waveform with a rise time of 21 ns is applied to an oscilloscope that has an upper cutoff frequency of 50 MHz?
(a) 18 ns (b) 22 ns
(c) 32 ns (d) 28 ns

71. Ans: (b)

Sol: t_{pr} = Pulse waveform rise time = 21 nsec

t_{cr} = Oscilloscope rise time = $\frac{0.35}{50 \times 10^6}$

= 7 nsec

Displayed rise time = $\sqrt{t_{pr}^2 + t_{cr}^2}$

$= \sqrt{(21 \times 10^{-9})^2 + (7 \times 10^{-9})^2}$

= 22.13 nsec

≅ 22 nsec

72. An FM telemetry system uses a 370 Hz-430 Hz voltage-controlled oscillator to carry the fuel level of 3000 I tank, where 370 Hz represents an empty tank and 430 Hz represents full tank. What level does 408 Hz represent?
(a) 1650.66 I (b) 2533.33 I
(c) 3301.32 I (d) 4504.18 I

72. Ans: (*)

Sol: $f_i = f_c + K_f L$

$370 = f_c + 0$

$f_c = 370\text{Hz}$

$430 = f_c + K_f \times 3000\ I$

$430 = 370 + K_f \times 3000\ I$

$K_f = \frac{60}{3000I}$

$408 = 370 + \frac{60}{3000I}$

$38 = \frac{60}{3000I} * L$

$L = 1900\ I$

73. Four strain gauges are mounted on a simple flat tensile specimen arranged for complete temperature compensation and maximum sensitivity when connected in a four-arm bridge circuit. An $8\times10^5\Omega$ calibration resistor is shunted across one of the strain gauges. If the gauge resistances are each 188 Ω and the gauge factors are 1.22, then the effective strain is
(a) 545×10^{-6} (b) 775×10^{-6}
(c) 48.1×10^{-6} (d) 32.4×10^{-6}

73. Ans: (c)

Sol: The bridge has four active elements.

Effective strain = $\frac{R_g}{n\,G_f\,(R_g + R_{sh})}$

$= \frac{188}{4 \times 1.22(188 + 8 \times 10^5)}$

$= 4.814\times10^{-5}$

$= 48.14\times10^{-6}$

74. A 0-200 V voltmeter has a guaranteed accuracy of 1 percent of full-scale reading. The voltage measured by this instrument is 150 V. The percentage limiting error is
(a) 25.00% (b) 12.50%
(c) 2.66% (d) 1.33%

74. Ans: (d)

Sol: (0 - 200)V

%GAE = 11% F.S.V

$200 \times \frac{1}{100} = 2V$

$A_t = 150V$

$\%\ L.E = 150 \times \frac{x}{100} = 2$

$x = \frac{200}{150} = 1.33\%$

75. A voltage has a true value of 1.55 V. An analog indicating instrument with a scale range of 0-2.5 V shows a voltage of 1.48 V. What is the relative error?

(a) – 2.67% (b) – 1.60%

(c) – 4.52% (d) – 2.80%

75. Ans: (c)

Sol: $A_t = 1.55V$

Voltmeter range = (0 – 2.5)V

$A_m = 1.48$ V

$\%\ error = \frac{A_m - A_t}{A_t} \times 100$

$= \frac{1.48 - 1.55}{1.55} \times 100$

$= -4.516\%$

76. For the same average transmitted or modulated signal power and the same average noise power in the message bandwidth, a coherent SSB receiver will have exactly the same output signal-to-noise ratio as

(a) a coherent DSB-SC receiver

(b) an AM receiver

(c) a VSB receiver

(d) an SSB receiver

76. Ans: (c & d)

Sol: For the same average transmitted or modulated signal power and the same average noise power in the message bandwidth, a coherent SSB receiver will have exactly the same output signal-to-noise ratio as a VSB and SSB receiver.

77. Over a certain binary communication channel, the symbol 0 is transmitted with probability 0.4 and 1 is transmitted with probability 0.6. It is given that $p(\varepsilon/0) = 10^{-6}$ and $p(\varepsilon/1) = 10^{-4}$, where $p(\varepsilon/x_i)$ is the probability of detecting the error given that x_i is transmitted. What is the error probability of the channel?

(a) 0.604×10^{-3} (b) 0.604×10^{-5}

(c) 0.604×10^{-6} (d) 0.604×10^{-4}

77. Ans: (d)

Sol: $P_e = 0.4\times10^{-6} + 0.6\times10^{-4}$

$P_e = 0.004\times10^{-4} + 0.6\times10^{-4}$

$P_e = 0.604\times10^{-4}$

78. Which one of the following noises arises in electronic devices such as diodes and transistors because of the discrete nature of current flow?

(a) Shot noise (b) Thermal noise

(c) Gaussian noise (d) Random noise

78. Ans: (a)

Sol: Random fluctuations of the electric current in a DC current which originate due to fact that current active consists of a flow of discrete charge(electrons).

79. Which one of the following represents the output signal-to-noise ratio of a uniform quantizer? (where P denotes average power of the message signal m(t) and R denotes number of bits per sample)

(a) $\left(\frac{3P}{m_{max}^2}\right)2^{2R}$ (b) $\left(\frac{2P}{m_{max}^3}\right)2^{3R}$

(c) $\left(\frac{3P}{m_{max}^3}\right)2^{R}$ (d) $\left(\frac{3P}{m_{max}^2}\right)$

79. Ans: (a)

Sol: The output signal-to-noise ratio of a uniform quantizer $= \frac{3}{2}2^{2R}$

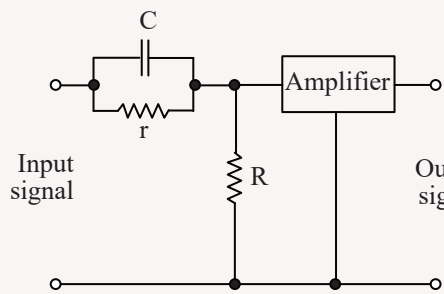
$= 3\left[\frac{P}{M_{max}^2}\right]2^{2R}$.

80. Removing the redundant information before encoding is the basic idea behind
(a) quantization
(b) delta modulation
(c) pulse-code modulation
(d) differential pulse-code modulation

80. Ans: (a)

Sol: Quantization is the process of removing the redundant information before encoding.

81. Identify the given circuit shown in the figure.



(a) Band-pass filter (b) De-emphasis filter
(c) Pre-emphasis filter (d) Band-reject filter

81. Ans: (c)

82. In which one of the following techniques, RF binary signals are transmitted as given?

$0:\sqrt{2}\,p'(t)\cos[\omega_c-(\Delta\omega/2)]t$

$1:\sqrt{2}\,p'(t)\cos[\omega_c+(\Delta\omega/2)]t$

(a) ASK (b) FSK
(c) PSK (d) MPSK

82. Ans: (b)

Sol: As we can see in the transmitted signals for '0' and '1' only frequency is changing, amplitudes and phases are same so it is FSK.

83. Which one of the following statements is **not** correct regarding the features of CDMA?
(a) Multipath fading may be substantially increased because the signal is spread over a large spectrum.
(b) Channel data rates are very high in CDMA systems.
(c) The near-far problem occurs at a CDMA receiver if an undersired user has a high detected power as compared to the desired user.
(d) Many users of a CDMA system share the same frequency.

83. Ans: (a)

Sol: In CDMA multipath fading is reduced.
So, option (a) is not correct.

84. How many 6 MHz wide TV channels can be multiplexed on 800 MHz coaxial cable?
(a) 96 (b) 266
(c) 133 (d) 48

84. Ans: (c)

Sol: Multiplexed channels

$$=\frac{800\times10^6}{6\times10^6}=133.33\simeq133$$

Directions:

Each of the next **six (06)** items consists of two statements, one labeled as 'Statement (I)' and the other as 'Statement (II)'. You are to examine these two statements carefully and select the answers to these items using the code given below.

(a) Both Statement (I) and Statement (II) are individually true and Statement (II) is the correct explanation of Statement (I)
(b) Both Statement (I) and Statement (II) are individually true but Statement (II) is **not** the correct explanation of Statement (I)
(c) Statement (I) is true but Statement (II) is false
(d) Statement (I) is false but Statement (II) is true

85. **Statement (I):** The magnetization curve is the relationship between air gap flux and the field winding m.m.f or field winding current.
Statement (II): No-load magnetization curve is the graph between armature-generated e.m.f and current with constant armature speed.

CLASSROOM COACHING
for ESE | GATE | PSUs - 2023 / 2024

@ Delhi

7838971777 (Call/WhatsApp)

- **Weekend Batches:**
  26th Feb-2022
- **Regular Batches:**
  21st Feb-2022, 27th Mar-2022, 16th Apr-2022,
  8th & 22th May-2022, 11th Jun-2022
- **Summer Short Term Batches:**
  8th & 22nd May-2022

@ Pune

9343499966

- **Evening Batch: 21st Feb-2022**
- **Weekend Batch: 19th Feb-2022**
- **MPSC (Prelims) Batch: 3trd Feb-2022**

@ Vizag

8374808999

- **Weekend Batch: 26th Feb-2022**

GENCO / TRANSCO / DISCOMS BATCHES

CLASSROOM COACHING & EXCLUSIVE ONLINE LIVE CLASSES

Starts from: 2nd MARCH 2022

Rs.5,000/- (for ACE old students - Classroom Coaching) | **10% OFF** (Early Bird Discount- Valid Till 28th February, 2022)
40% Discount (for ACE Old Students - Exclusive Online Live Classes)

APPSC/TSPSC-AEE (CIVIL)

CLASSROOM COACHING & EXCLUSIVE ONLINE LIVE CLASSES

Starts from: 2nd MARCH 2022

Rs.5,000/- OFF (for ACE Old Students)

85. Ans: (b)

Sol: Both Statement (I) and Statement (II) are individually true but Statement (II) is **not** the correct explanation of Statement (I)

86. **Statement (I):** Some of the common and familiar polymer are polyethylene (PE), nylon, polyvinyl chloride (PVC), polycarbonate (PC), polystyrene (PS) and silicone rubber.
Statement (II): Polymers include the familiar plastic and rubber materials.

86. Ans: (b)

87. **Statement (I):** Voltage (or potential difference) is the energy required to move a unit charge through an element.
Statement (II): Power is the time rate of expending or absorbing energy.

87. Ans: (b)

Sol: **Statement (I):** $V = \frac{W}{q}$

Work done per unit charge is called voltage (or) pertential difference.

Statement (II): $P = \frac{W}{t}$

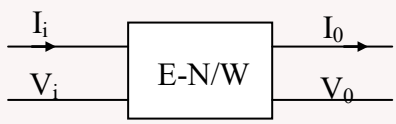
Rate of work done is called power.

Both the statements are correct but Statement (II) is not the correct explanation of statement (I).

88. **Statement (I):** A transfer function is a function which relates the current or voltage at one port to the current or voltage at another port.
Statement (II): If the function has one or more poles in the right-half plane, then the function is non-minimum phase.

88. Ans: (b)

Sol:



$$T.F = \frac{I_0(s)}{I_s(s)} \text{ or } \frac{V_0(s)}{V_s(s)}$$

Statement-2: Non minimum phase system

$\Rightarrow$ One or more poles in the right-half plane.

89. **Statement (I):** Antenna is a transformation device converting electromagnetic photons into circuit currents.
Statement (II): An antenna converts photons to currents or vice versa.

89. Ans: (b)

Sol: Antenna is a transformation device converting electromagnetic photons into circuit currents.

An antenna converts photons to currents or vice versa.

Both Statement (I) and Statement (II) are individually true but Statement (II) is **not** the correct explanation of Statement (I).

90. **Statement (I):** Shannon has shown that it is possible to achieve error-free communication by adding sufficient redundancy.
Statement (II): The addition of an extra check digit increases redundancy.

90. Ans: (a)

Sol: As addition of an extra check digit increases redundancy so, it is possible to achieve error-free communication by adding sufficient redundancy.

91. A unity feedback system has

$$G(s) = \frac{K(2s+1)}{s(4s+1)(s+1)^2}$$

What is the value of K if the steady-state value of error is to be less than 0.1, when an input r(t) = 1 + 5t is applied?

(a) K = 5 (b) 6 < K < 10
(c) 11 < K < 40 (d) K > 50

91. Ans: (d)

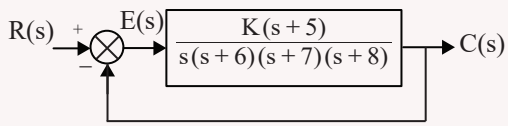
Sol: $G(s) = \frac{K(2s+1)}{s(4s+1)(s+1)^2}, H(s) = 1$

$r(t) = (1 + 5t)$

$e_{ss} < 0.1$

$e_{ss} = 0 + \frac{5}{K} \Rightarrow \frac{5}{K} < 0.1 \Rightarrow K > 50$

92. For the given control system, what is the value of K so that there is 10% error in the steady state?



(a) 172 (b) 272
(c) 572 (d) 672

92. Ans: (d)

Sol: $e_{ss} = 10\% = 0.1$

$$G(s) = \frac{K(s+5)}{s(S+6)(s+7)(s+8)}, H(s) = 1$$

$$e_{ss} = \frac{A}{K} = \frac{1}{\frac{5K}{6\times 7\times 8}} = \frac{336}{5K}$$

$$0.1 = \frac{336}{5K}$$

$$K = 672$$

93. In an underdamped second-order system, the time required for the waveform to go from 0.1 of the final value to 0.9 of the final value is called.

(a) rise time (b) peak time
(d) settling time (d) final time

93. Ans: (a)

Sol: Rise time: It is the time require to rise from 0% to 100% of final value. (≃10%)

94. The open-loop transfer function of a unity feedback system is given by

$$G(s) = \frac{K}{s(\tau s + 1)}$$

By what factor should the amplifier gain K be multiplied so that the damping ratio is increased from 0.25 to 0.75?

(a) 0.1111 (b) 1.1111
(c) 0.3333 (d) 3.3333

94. Ans: (a)

95. Consider the following statements regarding feedback compensation of control system:

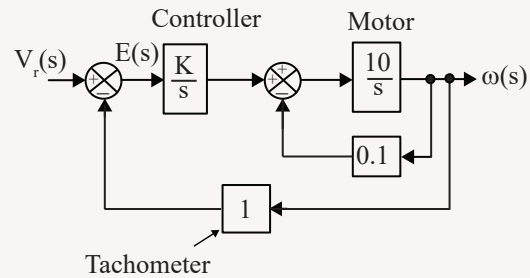
1. A faster response can be achieved by the use of parallel compensation.
2. The environmental conditions in which the feedback control system is to be utilized affect the stability of the controlled quantity.
3. The degree of accuracy and the stability of a control system can be improved by the use of a cascade compensator.

Which of the above statements are correct.

(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

95. Ans: (d)

96. Consider the speed control system shown in the figure wherein the inner loop corresponds to motor back e.m.f., the controller is an integrator with gain K observes that the load is inertia only. What is the value of K for which steady-state error to unit ramp input $\left(v_r(s) = \frac{1}{s^2}\right)$ is less than 0.01 rad/sec?



(a) 5 (b) 7
(c) 10 (d) 14

96. Ans: (c)

Sol: $$G(s) = \frac{10K}{s(s+1)}$$

$$e_{ss} < 0.01$$

$$e_{ss} = \frac{1}{10K} < 0.01$$

$$K > \frac{1}{0.01\times 10} > 10$$

97. The subsystem that generates the input to the plant or process is known as
(a) controller (b) controlled variable
(c) controllability (d) compensator

97. Ans: (a)

98. Consider the following statements regarding compensator:
1. The lead compensator reduces the noise signal level relative to the control signal.
2. Introduction of cascade lead compensator increases the gain crossover frequency and consequently, the speed of the response of resulting system.
3. The lead compensation increases the system bandwidth.

Which of the statements are correct?
(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2, and 3

98. Ans: (c)

99. Which of the following is/are used, when the cascade compensator does not employ pure integration?
(a) Lead compensator only
(b) Lag compensator only
(c) Neither lead nor lag compensator
(d) Both lead and lag compensators

99. Ans: (b)

100. Consider the following statements regarding signals :
1. Deterministic signal is a signal about which there is no uncertainty with respect to its value at any time.
2. Each signal within the ensemble has a certain probability of occurrence and the ensemble of signals is referred to as a random process.
3. EEG signal is an example of random signal.

Which of the above statements are correct.
(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

100. Ans: (d)

101. Which one of the following techniques can be used to analyze and design the effect of loop gain upon the system's transient response and stability?
(a) Open-loop transfer function technique
(b) Closed-loop transfer function technique
(c) Root locus technique
(d) Compensation technique

101. Ans: (c)

102. Consider the following statements regarding time response specifications:
1. Delay time is the time required for the response to reach 10% to 90% or 5% to 95% or 0% to 100% of its final value.
2. Peak time is the time required for the response to reach the first peak overshoot.
3. Settling time is the time required for the response to reach and maintain beyond a specified tolerance band, i.e., either 3% or 5% of the initial value.

Which of the above statements are not correct?
(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3 only

102. Ans: (c)

103. Which one of the following fibers has the distinct advantage of low intermodal dispersion?
(a) Multimode step-index fiber
(b) Single-mode step-index fiber
(c) Graded-index multimode fiber
(d) Spatially incoherent multimode fiber

103. Ans: (a)

Sol: Multimode step-index fiber has the distinct advantage of low intermodal dispersion.

104. Which one of the following statement is **not** correct?
(a) The noise performance of a full AM receiver is always inferior to that of a DSB-SC receiver.
(b) The figure of merit of a DSB-SC receiver using coherent detection is always unity.
(c) The figure of merit of an SSB receiver using coherent detection is always unity.

(d) The figure of merit of an AM receiver using envelope detection is always greater than unity.

104. Ans: (d)

Sol: The figure of merit of an AM receiver using envelope detection is always less than unity.
So, option (d) is the incorrect statement.

105. The RF carrier range and IF bandwidth corresponding to AM radio receiver are respectively.
(a) 0.535 MHz - 1.605 MHz and100 kHz
(b) 53.5 MHz - 160.5 MHz AND 10 kHz
(c) 0.535 MHz - 1.605 MHz and 10 kHz
(d) 53.5 MHz - 160.5 MHz and 100 kHz

105. Ans: (c)

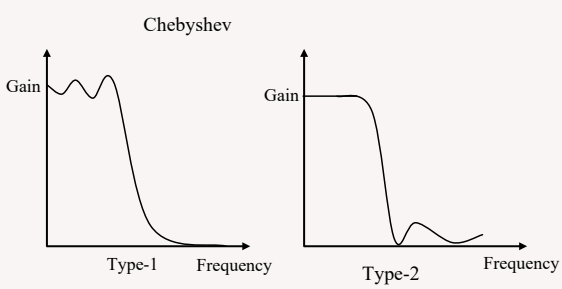
Sol: The standard carrier range for AM radio receiver is 535 kHz to 1605 kHz and standard bandwidth is 10 kHz.

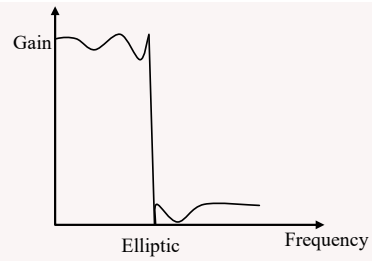
106. Consider the following statements regarding filters:
1. Cauer filter has equiripple passband and stopband.
2. For a given filter order, passband and stopband deviations, Cauer filters have more transition bandwidth as compared to Chebyshev filters.
3. Linear phase characteristics cannot be achieved in IIR filters.

Which of the above statements are correct?
(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

106. Ans: (b)

Sol: Cauer (Elliptic) filter can achieve sharper cut off than Chebyshev but reduced S.B performance.





107. Consider the following statements regarding 8051 microcontroller:
1. The size of RAM in 8051 is 128 bytes.
2. RAM locations 00-1FH are assigned to the register banks and stack.
3. RAM locations 20-2FH are available as a place to save byte-sized data.

Which of the above statements are correct?
(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) 1, 2 and 3

107. Ans: (a)

Sol: RAM locations 20-2FH are available as a place to save bit-sized data.

108. Consider the following statements regarding non-volatile RAM (NV-RAM) in 8051 :
1. When the power is turned off, the contents are lost.
2. NV-RAM uses extremely power efficient SRAM cells built out of CMOS.
3. It uses an intelligent control circuitry.

Which of the above statements are correct.
(a) 1, 2 and 3 (b) 1 and 2 only
(c) 2 and 3 only (d) 1 and 3 only

108. Ans: (c)

Sol: When the power is turned off, the contents are not lost.

109. Which one of the following statements is **not** correct for CMOS technology in comparison with bipolar technology?
(a) CMOS technology has low static power dissipation.
(b) CMOS technology has high input impedance.

Exclusive Online Live Classes [HINDI]

Regular Batch Starts from

26th Feb-2022

Duration: **8 - 10 months**
Timings: **6:30 PM - 10:30 PM**

10% OFF (Early Bird Discount - Till: 25th FEB-2022)

EXCLUSIVE ONLINE LIVE CLASSES

SSC-JE (GS & Technical)

CIVIL ENGINEERING & ELECTRICAL ENGINEERING

NEW BATCH STARTS FROM:

21st MARCH 2022

10% DISCOUNT
EARLY BIRD OFFER
(TILL: 20TH MARCH 2022)

SPEICAL DISCOUNT
(for ACE old students)

(c) CMOS technology has high delay sensitivity to the load.

(d) CMOS technology has high output drive current.

109. Ans: (d)

Sol: CMOS technology has high output drive current.

110. Consider the following statement regarding MOS circuit design process.

1. MOS circuits are formed on four basic layers n-diffusion, p-diffusion, polysilicon and metal, which are isolated from one another by thick or thin silicon dioxide insulating layers.
2. Thin oxide (thinox) mask region includes n-diffusion, p-diffusion and transistor channels.
3. Polysilicon and thinox regions interact so that a transistor is formed where they cross one another.

Which of the above statements are correct?

(a) 1 and 2 only (b) 1 and 3 only

(c) 2 and 3 only (d) 1, 2 and 3

110. Ans: (d)

Sol: 1 and 2 only

111. The ratio of total number of transistors on the chip to the number of transistor circuits that must be designed in detail is known as

(a) capacity (b) regularity

(c) design efficiency (d) design density

111. Ans: (b)

112. If V is a scalar, then the given equation (in spherical coordinate system)

$$\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2\frac{\partial V}{\partial r}\right)+\frac{1}{r^2\sin\theta}\frac{\partial}{\partial\theta}\left(\sin\theta\frac{\partial V}{\partial\theta}\right)+\frac{1}{r^2\sin^2\theta}\frac{\partial^2 V}{\partial\phi^2}=-\frac{\rho}{\varepsilon}$$

is referred to as

(a) Laplace's equation (b) Poisson's equation

(c) gradient of V (d) divergence of V

112. Ans: (b)

Sol: Poisson's equation is given as

$$\nabla^2 V=-\frac{\rho}{\varepsilon}$$

in spherical coordinate system

$$\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2\frac{\partial V}{\partial r}\right)+\frac{1}{r^2\sin\theta}\frac{\partial}{\partial\theta}\left(\sin\theta\frac{dV}{d\theta}\right)+\frac{1}{r^2\sin^2\theta}\frac{\partial^2 V}{\partial\phi^2}=\frac{-\rho}{\varepsilon}$$

113. The intrinsic impedance of free space is

(a) 107 Ω (b) 214 Ω

(c) 377 Ω (d) 754 Ω

113. Ans: (c)

Sol: In free space, intrinsic impedance,

$$\eta=\sqrt{\frac{\mu_o}{\varepsilon_o}}=\sqrt{\frac{4\pi\times10^{-7}}{10^{-9}/36\pi}}=120\,\pi \text{ or } 377\ \Omega$$

114. Which one of the following is an angle at which there is no reflected wave when the incident wave is parallel (or vertically) polarized?

(a) Critical angle (b) Reference angle

(c) Relative angle (d) Brewster angle

114. Ans: (d)

Sol: Brewster angle is the angle of incidence for which there is no reflection i.e. reflection co-efficient is zero.

Brewster angle for paralleled polarization exist & is given by $\tan\theta_B=\sqrt{\frac{\varepsilon_2}{\varepsilon_1}}$

115. The condition for the low-loss transmission line is

(a) R>> ωC and G >> ωL

(b) R<< ωL and G << ωC

(c) $\frac{R}{G}=\frac{L}{C}$

(d) RG >>> LC

115. Ans: (b)

Sol: A line is said to be loss less transmission line if it has R << ωL, G << ωC at the operating frequency.

116. Consider the following statements regarding impedance matching :
1. When the line is terminated in an impedance other than its characteristic impedance, reflection will occur and there will be standing waves of voltage and current along the line which may be very large if there is considerable mismatch.
2. The single-stub device has the advantage that it will match any load
3. The double stub has the disadvantage that the line length needs to be adjustable.

Which of the above statements are correct?
(a) 2 and 3 only (b) 1 and 2 only
(c) 1 and 3 only (d) 1, 2, and 3

116. Ans: (d)

Sol: When load impedance is not equal to characteristics impedance, there is a mismatch and reflection will occur & there will be standing waves.
so statement (1) is correct.
Single stub is use to match any load (It can be real load or complex load) but for different load, we need to change location.
Statement (2) is correct.
In double-stub matching, the location of stub is fixed but for different load, we need to change the length of the stub.
So statement (3) is correct.

117. The wave impedance in z direction for TE wave is

(a) $Z_z(TE) = \dfrac{\eta}{\sqrt{\left(1+\frac{\omega_c^2}{\omega^2}\right)}}$

(b) $Z_z(TE) = \dfrac{2\eta}{\sqrt{\left(1-\frac{\omega_c^2}{\omega^2}\right)}}$

(c) $Z_z(TE) = \dfrac{\eta}{\sqrt{\left(1-\frac{\omega_c^2}{\omega^2}\right)}}$

(d) $Z_z(TE) = \dfrac{2\eta}{\sqrt{\left(1+\frac{\omega_c^2}{2\omega^2}\right)}}$

117. Ans: (c)

Sol: We know, $\eta_{TM} < \eta_{TEM} < \eta_{TE}$

$$\eta_{TE} = \frac{\eta}{\sqrt{1-\left(\frac{f_c}{f}\right)^2}} = \frac{\eta}{\sqrt{1-\left(\frac{\omega_c}{\omega}\right)^2}}$$

118. Which one of the following is the ratio of power lost per unit length to the twice of power transmitted?
(a) Attenuation factor
(b) Power efficiency
(c) Quality factor
(d) Transmission efficiency

118. Ans: (a)

Sol: Attenuation factor is the ratio of power lost per unit length to the twice of power transmitted.
Attenuation constant,

$$\alpha = \frac{\text{Power lost per unit distance}}{2 \times \text{total power transmitted}}$$

$$\alpha = \frac{\left[\frac{-dw}{dz}\right]}{2w}$$

119. A section of x-band waveguide with dimensions a = 2.286 cm and b = 1.016 cm has perfectly conducting walls and is filled with a lossy dielectric $\left(\sigma_d = 367.5\frac{\mu S}{m}, \varepsilon_r = 2.1, \mu_r = 1\right)$. The cutoff frequency of TE_{10} for the dominant mode of propagation at a frequency of 9 GHz is
(a) 2.27 GHz (b) 4.53 GHz
(c) 6.80 GHz (d) 9.07 GHz

119. Ans: (b)

Sol: Given : a = 2.286 cm
b = 1.016 cm
$\varepsilon_r = 2.1$, $\mu_r = 1$
$\sigma_d = 367.5$ μS/m
$f = 9 \times 10^9$ Hz

In general, $\varepsilon_r' = \varepsilon_r(1 - \tan\delta)$

Hence $\tan\delta \simeq 0$ as conductivity very small

so $\varepsilon'_r = \varepsilon_r$

for TE_{10}

cut off frequency is given as,

$$fc_{TE_{10}} = \frac{1}{2\sqrt{\mu_0 \varepsilon_0 \varepsilon_r}}\left(\frac{1}{a}\right) = \frac{c}{2\sqrt{\varepsilon_r}} \times \frac{1}{a}$$

$$= \frac{3 \times 10^{10}}{2 \times \sqrt{2.1}} \times \frac{1}{2.286} = 4.53 \text{ GHz}$$

120. The antenna or array designed to yield directive gain appreciably greater than that obtainable from uniform distribution has become known as
(a) superheterodyne array
(b) supergain array
(c) super antenna
(d) universal antenna

120. Ans: (b)

Sol: Supergain array or Hanson woodyard is a special array designed from maximum directivity.

121. The highest frequency that is returned to the earth at a given distance is called
(a) maximum available frequency
(b) maximum communication frequency
(c) maximum bandwidth frequency
(d) maximum usable frequency

121. Ans: (d)

Sol: maximum usable frequency is the highest frequency that is returned to the earth at a given distance.

122. The mean sun does move at a uniform speed but otherwise requires the same time as the real sun to complete one orbit of the earth, this time being
(a) the tropical year
(b) the leap year
(c) the Julian calendar year
(d) the Gregorian calendar year

122. Ans: (b)

Sol: The mean sun does move at a uniform speed but otherwise requires the same time as the real sun to complete one orbit of the earth, this time being the leap year.

123. Which one of the following statements is not correct regarding SONET networks?
(a) A point-to-point network is normally made of an STS multiplexer.
(b) A linear synchronous optical network can be point-to-point or multipoint.
(c) The signal flow can be unidirectional or bidirectional.
(d) A multipoint network uses STS multiplexers to allow the communications between several terminals.

123. Ans: (a)

Sol: A point-to-point network is not made of an STS multiplexer.
A linear synchronous optical network can be point-to-point or multipoint.
The signal flow can be unidirectional or bidirectional.
A multipoint network uses STS multiplexers to allow the communications between several terminals.
So option (a) is the incorrect statement.

124. A digital optical fiber communication system operating at a wavelength of 1 μm requires a maximum bit error rate of 10^{-9}. What is the theoretical quantum limit at the receiver in terms of the quantum efficiency of the detector and the energy of an incident photon?
(a) $\frac{20.7hf}{\eta}$ (b) $\frac{10.7hf}{\eta}$
(c) $\frac{20.7\eta}{hf}$ (d) $\frac{10.7\eta}{hf}$

124. Ans: (a)

Sol: The theoretical quantum limit = $\frac{20.7hf}{\eta}$

125. With frequency reuse, several cells with no space in a given coverage area use the same set of frequencies. Two cells using the same set of frequencies are called
(a) hexagonal shape cells
(b) adjacent channel cells
(c) cluster neighbour cells
(d) co-channel cells

125. Ans: (d)

Sol: Two cells using the same set of frequencies are called co-channel cells

126. The component in the satellite that takes an uplink signal and converts into a downlink signal is called.
(a) uplink device (b) transponder
(c) downlink device (d) transmitter

126. Ans: (b)

Sol: The component in the satellite that takes an uplink signal and converts into a downlink signal is called transponder

127. An advantage of passive satellites is that they do not require sophisticated electronic equipment on board, although they are not necessary void of power. Some passive satellites require which one of the following for tracking and ranking purposes?
(a) Radio beacon transmitter.
(b) Defense launched courier
(c) Radio beacon receiver
(d) Satellite beacon launcher

127. Ans: (c)

Sol: Passive satellites require radio beacon receiver for tracking and ranking purposes

128. Some of the diffracted light continues down the fiber and some of it escapes through the cladding. The light rays that escape represent a loss in light power which is called.
(a) Rayleigh scattering loss
(b) Chromic distortion loss
(c) chromatic distortion loss
(d) predominant fiber loss

128. Ans: (a)

Sol: The light rays that escape represent a loss in light power is called Rayleigh scattering loss

129. Numerical aperture is closely relate to acceptance angle and is the figure of merit commonly used to measure.
(a) the sine of the maximum angle
(b) the magnitude or the acceptance angle
(c) the maximum angle of light ray
(d) the intensity of light ray entering the cable.

129. Ans: (c)

Sol: Maximum angle with the axis of the optical fiber at which light can enter fiber, in order to propagate into it is numerical aperture, $NA = n_0 \sin\theta_{Max}$.

130. Consider the following statements regarding programmable interrupt controller 8259A:
1. 8259A is specifically designed for use with the INTR/INT) of 8085 microprocessor,
2. It can solve eight levels of interrupt priorities in a variety of modes
3. With additional 8259A devices, the priority scheme can be expanded to 32 levels.

Which of the above statement is/are not correct
(a) 1 and 3 (b) 2 only
(c) 3 only (d) 1 and 2

130. Ans: (a)

Sol: 8259A programmable interrupt controller is used to increase the interrupt handling ability of the microprocessor.
8259A can handle 8 interrupt inputs. By cascading multiple 8259s, 64 interrupts can be handled.
It is compatible with any INTEL microprocessors.

131. Consider the following statements regarding 8085 instruction set :
1. After execution of DAD instruction, if the result is larger than 16 bits, CY flag is set.
2. After execution of DCR instruction, S and CY flags will not be modified.
3. After execution of CMC instruction, only CY flag will be changed.

Which of the above statements is/are not correct?
(a) 1 only (b) 2 only
(c) 2 and 3 (d) 1 and 3

Hearty Congratulations to our

ESE - 2020 TOP RANKERS


AIR 1 — CHARUDATTA S — ME


AIR 1 — SHASHANK GAUR — EE


AIR 1 — PRAKASH JHA — E&T


AIR 1 — GAURAV KUMAR — CE


AIR 2 — K S SHARADRAO — ME


AIR 2 — ABHISHEK SINGH — EE


AIR 2 — PARTH BATRA — E&T


AIR 2 — PRASHANT SINGH — CE


AIR 3 — SURAJ KUMAR S — ME


AIR 3 — VIKASH SHANKAR — EE


AIR 3 — RAHUL NAREDI — E&T


AIR 3 — KULDEEP JANGRA — CE


AIR 4 — SHUBHAM B — ME


AIR 4 — ANUPAM S — EE


AIR 4 — SHUBHAM — E&T


AIR 4 — ANISH BAGGA — CE


AIR 5 — KAMLESH PARWAR — ME


AIR 5 — MANOJ KUMAR — E&T


AIR 5 — PAVITRA GOYAL — CE


AIR 6 — MD ZUHAIB — ME


AIR 6 — VISHWA SIMHAA — EE


AIR 6 — SAURAV KUMAR S — E&T


AIR 7 — PRATEEK S — ME


AIR 7 — DINESH KUMAR S — EE


AIR 7 — RAGHAV PURWAR — E&T


AIR 8 — V SAIKRISHNA REDDY — ME


AIR 8 — GAGAN GHUNAWAT — EE


AIR 8 — RAM KRISHNA — E&T


AIR 9 — GANESH KUMAR A — ME


AIR 9 — AKSHAY KUMAR T — EE


AIR 9 — CHHAVI JAIN — E&T


AIR 9 — ARPIT JAIN — CE


AIR 10 — HEMABH TRIVEDI — ME


AIR 10 — RAJAT DIXIT — EE


AIR 10 — L KUMARI JAISWAL — E&T


AIR 10 — AMIT SHARMA — CE

and many more...

TOTAL 36 RANKS IN TOP 10

ME	EE	E&T	CE
10	09	10	07

131. Ans: (b)

Sol: In 8085 microprocessor, execution of DCR will not affect CY flag.

132. If the memory chip size is 1024×1, then the number of memory chips needed to design 8 Kbyte memory is

(a) 16 (b) 32

(c) 64 (d) 128

132. Ans: (c)

Sol: No. of memory chips needed

$$= \frac{8KB}{1024 \times 1} = \frac{8 \times 1024 \times 8}{1024} = 64$$

133. Which one of the following statements is correct for the given system?

$$y(n) = x^2(n) + \frac{1}{x^2(n-1)}$$

(a) The given system is linear, non-causal and shift-variant.

(b) The given system is non-linear, causal and shift-invariant.

(c) The given system is non-linear, causal and shift-variant.

(d) The given system is linear, non-causal and shift-invariant.

133. Ans: (b)

Sol: $y(n) = x^2(n) + \frac{1}{x^2(n-1)}$

↓

Non-Linear, causal, shift-invariant.

134. If the impulse response h(n) and the output y(n) of a system are given as h(n) = {2, 1, 0, –1, 3} and y(n) = {2, –5, 1, 1, 6, –11, 6} then the input x(n) of the system is

(a) {1, –3, 2} (b) {2, –3, 1}

(c) {1, 3, 2, 1} (d) {2, –3, 1, 1}

134. Ans: (a)

Sol: h(n) = {2,1,0,–1,3} → 5 samples = N

y(n) = {2,–5,1,1,6,–11,6} → M+N–1

= 7 Samples

M = 3 Samples

$$\begin{array}{lccccccc} h(n) \rightarrow & 2 & 1 & 0 & -1 & 3 & & \\ x(n) \rightarrow & a & b & c & & & & \\ \hline & 2a & a & 0 & -a & 3a & & \\ & & 2b & b & 0 & -b & 3b & \\ & & & 2c & c & 0 & -c & 3c \\ \hline & 2 & -5 & 1 & 1 & & & \end{array}$$

$2a = 2 \Rightarrow a = 1$

$a + 2b = -5 \Rightarrow 2b = -6 \Rightarrow b = -3$

$b + 2c = 1 \Rightarrow 2c = 4 \Rightarrow c = 2$

135. The approximate transition width of main lobe in Blackman window is

(a) $4\pi/N$ (b) $8\pi/N$

(c) $12\pi/N$ (d) $16\pi/N$

135. Ans: (c)

Sol: Blackman window → $\frac{12\pi}{N}$

136. In antennas, if S_A, is the input signal generated by the source (by the receiving antenna) at temperature T_A, T_E is the effective noise temperature of the receiver network (referred to the input terminal), B is bandwidth and k is Boltzmann's constant, then the output signal-to-noise ratio is

(a) $\frac{S}{N} = \frac{S_A}{(T_A + T_E)kB}$ (b) $\frac{S}{N} = \frac{S_A T_A}{kBT_E}$

(c) $\frac{S}{N} = \frac{S_A(1 + T_A)}{kB(1 + T_E)}$ (d) $\frac{S}{N} = \frac{S_A T_A}{kB(1 + T_E)}$

136. Ans: (a)

Sol: Output signal-to-noise ratio is

$$\frac{S}{N} = \frac{S_A}{(T_A + T_E)kB}$$

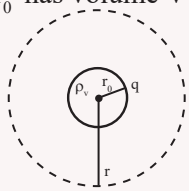
137. The average value of the electrostatic field over the volume V of a sphere due to a point charge q somewhere within the sphere, where r_0 is the position of the charge, is

(a) $E_{av} = -\frac{qr_0}{3\varepsilon_0 V}$ (b) $E_{av} = -\frac{qr_0}{4\pi\varepsilon_0 V}$

(c) $E_{av} = \frac{qr_0}{3\varepsilon_0 V}$ (d) $E_{av} = \frac{qr_0}{4\pi\varepsilon_0 V}$

137. Ans: (c)

Sol: Assume charge 'q' is uniformly distributed over the sphere of radius 'r_0' has volume V $\left(V = \frac{4}{3}\pi r_0^3\right)$



From Gauss's law

$D_r \times \text{Area} = Q_{enc}$

$D_r \times 4\pi r^2 = q$

Let $r = r_0$

$D_r \times 4\pi r_0^2 = q$

$D_r \times \frac{4}{3}\pi r_0^2 \times r_0 = \frac{qr_0}{3}$

$D_r = \frac{qr_0}{3\left(\frac{4}{3}\pi r_0^3\right)}$

$\varepsilon_0 E_r = \frac{qr_0}{3V}$

$\therefore$ Average electric field intensity,

$E_r = \frac{qr_0}{3\varepsilon_0 V}$ volt/m

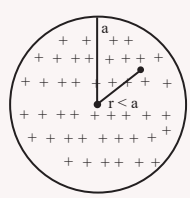
138. In the relation between the field and the potential, if r < a, then the potential at a point r, inside a uniformly charged sphere of radius a, is

(a) $\frac{a^3\rho}{3\varepsilon_0 r}$ (b) $\frac{\rho}{6\varepsilon_0}(3a^2 - r^2)$

(c) $\frac{4\pi a^3}{3r}$ (d) $\frac{2\pi}{3}(3a^2 - r^2)$

138. Ans: (b)

Sol: For r < a, $E = \frac{\rho r}{3\varepsilon_0}\hat{a}_r$



For r > a, $E = \frac{\rho a^3}{3\varepsilon r^2}\hat{a}_r$

$V_{r\infty} = \int_r^\infty \overline{E}.\overline{dr}$

$= \int_r^a \overline{E}.\overline{dr} + \int_a^\infty \overline{E}.\overline{dr}$

$= \int_r^a \frac{\rho r}{3\varepsilon_0} dr + \int_a^\infty \frac{\rho a^3}{3\varepsilon_0 r^2} dr$

$= \frac{\rho}{3\varepsilon_0}\left[\frac{r^2}{2}\right]_r^a + \frac{\rho a^3}{3\varepsilon_0}\left[\frac{r^{-2+1}}{-2+1}\right]_a^\infty$

$= \frac{\rho}{6\varepsilon_0}[a^2 - r^2] - \frac{\rho a^3}{3\varepsilon_0}\left[\frac{1}{\infty} - \frac{1}{a}\right]$

$= \frac{\rho}{6\varepsilon_0}[a^2 - r^2] + \frac{\rho a^2}{3\varepsilon_0}$

$= \frac{\rho}{3\varepsilon_0}\left[\frac{a^2}{2} - \frac{r^2}{2} + a^2\right]$

$= \frac{\rho}{3\varepsilon_0}\left[\frac{a^2 - r^2 + 2a^2}{2}\right] = \frac{\rho}{6\varepsilon_0}[3a^2 - r^2]$

$V_r = \frac{\rho}{6\varepsilon_0}[3a^2 - r^2]$

139. Which one of the following techniques is used to speed up the multiplication of two signed binary numbers in 2's complement notation?

(a) K-Map algorithm

(b) Booth's algorithm

(c) Pascal's algorithm

(d) De Morgan's algorithm

139. Ans: (b)

Sol: Booths algorithm provides excellent performance when the multiplier is having string of '0's and string of '1's.

140. Which one of the following functions is not correct for an operating system?

(a) Allocating storage and memory

(b) Handling basic input and output operations

(c) Providing protected sharing of the computer among multiple applications

(d) Quick execution of instructions

140. Ans: (d)

Sol: Option (a) is Memory Management

Option (b) is I/O Management

Option (c) is Synchronization

All these are primary responsibilities of OS.

Hence, option (d) is the answer

141. Which of the following basic steps are needed in order to perform a memory read operation?

1. The address of the location from which the word is to be read is loaded into the memory address register (MAR).
2. A signal, called read (issued by the CPU indicating that the word whose address is in the MAR) is to be read into the MDR.

3. Corresponding to the memory delay in reading the specified word, the required word will be loaded by the memory into the MDR ready for use by the CPU.

Select the correct answer using the code given below.

(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

141. Ans: (d)

Sol: All statements are true.

Memory Reading Operation

T_1 MAR ← Address

T_2 MDR ← (MAR)

T_3 Buffer ← MDR Reg.

T_1, T_2 and T_3 are timing signals (clock cycles).

142. Which one of the following addressing modes is used to compute the address of the operand by adding a constant value to the content of a register?

(a) Immediate addressing
(b) Indexed addressing
(c) Absolute addressing
(d) Direct addressing

142. Ans: (b)

Sol: Only in Computable Addressing Modes, the constant is added to the register content for generating effective address.

143. Which of the following statements is/are correct for memory-mapped I/O?

1. The advantage of memory-mapped I/O is the ability to execute a number of memory-dedicated instructions on the registers in the I/O devices in addition to the elimination of the be need for dedicated I/O instructions.
2. The disadvantage of memory mapped I/O is the need to dedicate part of the memory address space for I/O devices.

Select the correct answer using the code given below.

(a) 1 only (b) 2 only
(c) Neither 1 nor 2 (d) Both 1 and 2

143. Ans: (d)

Sol: Memory Mapped IO technique is used to connect more number of IO devices but in this, valuable memory space is wasted. In this, one memory location address is used for one IO device connection.

144. Which one of the following addressing modes is similar to the register indirect addressing mode in the sense that the effective address of the operand is the content of a register, which is included in the instruction?

(a) Relative mode
(b) Autoincrement mode
(c) Autodecrement mode
(d) Immediate addressing mode

144. Ans: (b)

Sol: Auto increment A. M. is similar to the Register indirect AM except the increment of the Address Register Content.

In Auto increment A.M, DSP provides the Effective Address.

145. A floating-point (FP) number is said to be normalized, if the leftmost bit of the mantissa is

(a) 1 (b) 0
(c) –1 (d) 2

145. Ans: (a)

Sol: Normalization is the process of maintaining the non zero digit (1) in the MSB of the mantissa.

146. In order to keep track of the instruction locations, which one of the following contains the value of memory location assigned to the instruction or operand being processed

(a) LD (b) STA
(c) END (d) ILC

146. Ans: (*)

Sol: In the given options, no one satisfies the given question, the correct answer is program counter(PC).

147. Addition of two n-bit numbers A and B can be carried out using n consecutive full adders in an arrangement, which is known as
(a) carry-ripple counter
(b) carry-ripple through adder
(c) carry-ripple through binary
(d) carry-ripple through subtractor

147. Ans: (b)

Sol: 'n' bit Ripple Carry Adder uses n number of full adders and it is used to perform addition on two number of 'n' bit data.

148. Which of the following instructions are long and allow maximum parallelism since each bit controls a single control line?
(a) Horizontal microinstructions
(b) Vertical microinstructions
(c) Diagonal microinstructions
(d) Jumbled microinstructions

148. Ans: (a)

Sol: Horizontal microprogram control word uses one bit for one control signal and it provides highest degree of parallelism.

149. Which one of the following tables is generated in pass one and has an entry for every symbol in the program to perform its function?
(a) Symbol table
(b) Opcode table
(c) Pseudo-instruction table
(d) Addressing instruction table

149. Ans: (a)

Sol: Symbol Table is generated in pass 1 and has an entry for every symbol in the program to perform its function.

150. Which one of the following is the entity that can combine object modules that may have resulted from assembling multiple assembly modules separately?
(a) Compiler (b) Interpreter
(c) Linker (d) Loader

150. Ans: (c)

Sol: Linker can combine object modules that may have resulted from assembling multiple assembly modules separately.

Hearty Congratulations to our

GATE - 2021 TOP RANKERS


AIR 1ST IN
PRATIK PRAKASH SHINDE


AIR 1ST EE
AAKASH DHILL


AIR 1ST ME
SUYASH SHARMA


AIR 1ST PI
GANESH ADIGAUR


AIR 1ST XE
VARUN KAUSHIK


AIR 2nd ME
JAY CHAVDA


AIR 2nd PI
GOWTHAM GUDIMELLA


AIR 2nd EC
M POOJASREE


AIR 2nd ES
ANUSH VERMA


AIR 3rd ME
MUNISH KUMAR


AIR 3rd ME
NUKULA VISWA TEJA


AIR 3rd PI
REHAN ANWAR DESAI


AIR 3rd EC
MANOJ KUMAR


AIR 3rd CE
SHASHIKANT KUMAR


AIR 3rd EE
JAYMAL KHUNTI


AIR 4th PI
ROHIT SONI


AIR 4th EC
P AKHIL


AIR 4th IN
DIVAKAR CH.


AIR 4th IN
SAURABH JAISWAL


AIR 4th XE
JATIN BHANDARI


AIR 4th ES
HEMANTH TIWARI


AIR 5th ME
ABHISHEKA


AIR 5th EC
VAISHNAV KV


AIR 5th CE
PRASHANT DWIVEDI


AIR 5th CS
PANKAJ LAHKAR


AIR 5th CS
S BHATTACHARJEE


AIR 5th PI
SUBHANSHU TIWARI


AIR 6th ME
ABHISHEK MEWAR


AIR 6th PI
AKASH JAISWAL


AIR 6th EC
PARAG SAROHA


AIR 6th IN
HARSHIT GUPTA


AIR 6th IN
RAJU SHARMA


AIR 6th CE
TANMAY MAHAJAN


AIR 6th XE
MANISH YADAV


AIR 7th ME
VATSAL PANCHAL


AIR 7th PI
SACHIN DUBOLIYA


AIR 7th PI
ATULYA JYOTHI


AIR 8th ME
RAJAT GUPTA


AIR 8th ME
ROHIT S PATIL


AIR 8th EC
ANKUR LAL MEENA

AIR 8th IN
KUNAL SAURAV

AIR 8th CE
PRANSHU JANGID

AIR 8th CE
RAHUL PATI

AIR 8th EE
UJJWAL KUMAR

AIR 8th EE
HEMANT JINDAL

AIR 9th EC
ABHISHEK SINGH

AIR 9th EC
ALEESHA ROSE

AIR 9th EC
SAI VAMSI DOSAPATI

AIR 9th IN
RAMESH KUMAR

AIR 9th CS
NIRANJAN NITIN DHOOT

AIR 9th XE
RACHIT KUMAR

AIR 10th ME
DEEPESH AGARWAL

AIR 10th PI
VYOM SHARMA

AIR 10th IN
PRAGYA KAUSHIK

AIR 10th CE
GOVIND PRASAD B

AIR 10th XE
D KUMAR PATIL

AIR 10th XE
R SHIVAJI NALE

and many more...

Total 57 Ranks in Top 10

ME : 10	PI : 09	CE : 08	EE : 4	EC : 09	CS : 03	IN : 08	XE : 06