

SET-“Z”

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(Ph.D/URS-EE Jan. 2022)

Code



**ELECTRONICS & COMMUNICATION
ENGINEERING**

Sr. No. 10005

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Father's Name : _____

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(Signature of the candidate)

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1. All questions are compulsory.
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A,B,C and D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E-Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
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Question No.	Questions
1.	SCR stand for (1) Silicon Current Rectifier (2) Silicon Convert Rectifier (3) Silicon Controlled Rectifier (4) None of these
2.	TRAIC is (1) Unidirectional thyristor (2) Bidirectional thyristor (3) Tri-directional thyristor (4) None of these
3.	Which statement is correct ? (1) SCR is three junction and four layers semiconductor device (2) SCR is two junction and four layers semiconductor device (3) SCR is three junction and two layers semiconductor device (4) SCR is four junction and three layers semiconductor device
4.	The dv/dt protection of SCR is achieved by using (1) RL circuit in series with SCR (2) RC circuit across SCR (3) L in series with SCR (4) RC circuit in series with SCR
5.	Which component is required to increase the switching speed in SMPA ? (1) MOSFET (2) SCR (3) Transistor (4) All of these

Question No.	Questions
6.	<p>If all the poles of the system lie in the left half of s-plane then system is</p> <p>(1) Unstable (2) Marginally stable</p> <p>(3) Stable (4) None of these</p>
7.	<p>The step size of stepper motor with 10 rotor tooth is</p> <p>(1) 36° (2) 45°</p> <p>(3) 25° (4) 26°</p>
8.	<p>Transfer function is defined as</p> <p>(1) Linear and time variant system</p> <p>(2) Linear and invariant system</p> <p>(3) Non-linear and time variant system</p> <p>(4) Non-linear and time invariant system</p>
9.	<p>The main drawback of feedback system</p> <p>(1) Inaccuracy (2) Inefficiency</p> <p>(3) Insensitivity (4) Instability</p>
10.	<p>Which of the following statement is correct ?</p> <p>(1) Proportional-Derivative (PD) controller is equivalent to high pass filter</p> <p>(2) For better performance, integral action is initiated before derivative action</p> <p>(3) A practical PID controller uses a high gain amplifier in the forward path</p> <p>(4) High proportional gain is an alternative to derivative actions</p>

Question No.	Questions
11.	A zero to 300 V voltmeter has a guaranteed accuracy of 1% full scale reading. The voltage measured by the instruments is 83 V. The percent limiting error is (1) 0.67 (2) 2.63 (3) 3.62 (4) 1.67
12.	Frequency can be measured by using (1) Maxwell's bridge (2) Wein's bridge (3) Schering bridge (4) None of these
13.	A linear displacement transducer (such as digital) is generally uses (1) Gray Code (2) Binary code (3) Excess 3 code (4) Octal code
14.	Hall effect transducer is applicable for such type of measurement like (1) Power (2) Displacement (3) Current (4) All of these
15.	Which type of detector is used in ac bridges for audio frequency range ? (1) AC voltmeter (2) CRO (3) Headphone (4) Vibration galvanometer

Question No.	Questions
16.	<p>Which of the following optical transducers used is an active transducer ?</p> <p>(1) Photo voltaic cell (2) Photo emission cell</p> <p>(3) Photo diode (4) Photo transistor</p>
17.	<p>A compensated wattmeter has its reading corrected for the error due to</p> <p>(1) Friction</p> <p>(2) Frequency</p> <p>(3) Power consumed due to load</p> <p>(4) Power consumed in potential coil</p>
18.	<p>A dual beam CRO has</p> <p>(1) Two horizontal amplifiers</p> <p>(2) Two trigger circuits</p> <p>(3) Two vertical amplifiers</p> <p>(4) All the above</p>
19.	<p>A template matching is performed on an EEG signal with spike and wave by matched filter. Which of the following statements are true ?</p> <p>(1) Peaks in the filter response represent the presence of alpha wave</p> <p>(2) Peaks in the filter response represent the presence of spike and wave complexes</p> <p>(3) Matched filter does not cause a lag in the output</p> <p>(4) None of these</p>

Question No.	Questions
20.	<p>Internet of Things IoT is a network of</p> <p>(1) Sensors (2) Controllers</p> <p>(3) Actuators (4) All the above</p>
21.	<p>$E \times H$ of microwave gives</p> <p>(1) Instantaneous power (2) Average power</p> <p>(3) Peak power (4) Reactive power</p>
22.	<p>In a dielectric medium</p> <p>(1) $\nabla \times H = J$ (2) $\nabla \times H = D$</p> <p>(3) $\nabla \times H = 0$ (4) $\nabla \times H = \rho_v$</p>
23.	<p>The velocity of electron in klystron is proportional to :</p> <p>(1) Square root of beam voltage</p> <p>(2) Electron charge</p> <p>(3) Electron mass</p> <p>(4) Square root of mass of the electron</p>
24.	<p>The output efficiency of reflex klystron is the ratio of :</p> <p>(1) Output RF power to input RF power</p> <p>(2) Output RF power to input DC power</p> <p>(3) Output DC power to input DC power</p> <p>(4) Output DC power to RF input power</p>

Question No.	Questions
25.	<p>An EM field is said to be non-existent or not Maxwellian if it fails to satisfy Maxwell's equations and the wave equations derived from them. Which of the following fields in free space are not Maxwellian?</p> <p>(1) $H = \cos x \cos 10^6 t \mathbf{a}_x$ (2) $E = 100 \cos wt \mathbf{a}_x$ (3) $D = e^{-10y} \sin(10^5 t - 10y) \mathbf{a}_z$ (4) $B = 0.4 \sin 10^4 t \mathbf{a}_z$</p>
26.	<p>S-matrix exists for</p> <p>(1) Two ports only (2) Three ports only (3) Multiport network (4) Four ports</p>
27.	<p>A 500 m lossless transmission line is terminated by a load that is located at P on the Smith chart of Figure given below. If $\lambda = 150$ m, how many voltage maxima exist on the line?</p> <div data-bbox="678 1249 1029 1579" data-label="Figure"> </div> <p>(1) 7 (2) 6 (3) 5 (4) 3</p>

Question No.	Questions
28.	How many degenerate dominant modes exist in a rectangular resonant cavity for which $a = b = c$? (1) 2 (2) 3 (3) 5 (4) ∞
29.	If a small single turn loop antenna has a radiation resistance of 0.04Ω , how many turns are needed to produce a radiation resistance of 1Ω ? (1) 150 (2) 50 (3) 25 (4) 5
30.	Magic Tee can produce (1) Sum and difference of signals (2) Oscillations (3) Only sum of signals (4) Only difference of signals
31.	In 8086 microprocessor, address range of memory is (1) 00000 H – CCCCC H (2) 00001 H – FFFFFH (3) 00001 H – CCCCC H (4) 00000 H – FFFFFH
32.	8086 microprocessor is designed to operate in how many modes? (1) Two (2) Four (3) Eight (4) Sixteen

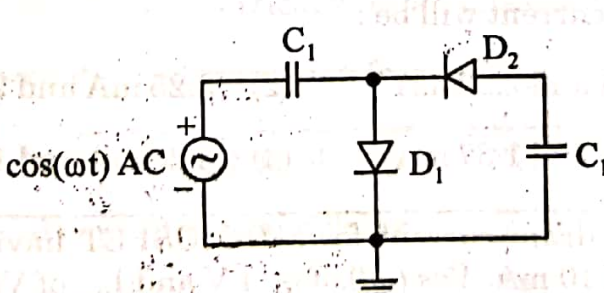
Question No.	Questions
33.	<p>Data pins of 16 bit ALU of 8086 is :</p> <p>(1) AD_{16} to AD_1 (2) AD_{15} to AD_0</p> <p>(3) AD_{15} to AD_1 (4) AD_{16} to AD_0</p>
34.	<p>Pointer register of 8086 is :</p> <p>(1) Base pointer (2) Index pointer</p> <p>(3) Segment pointer (4) Stack segment pointer</p>
35.	<p>For TRAP FLAG (TF = 0) in 8086 :</p> <p>(1) Microprocessor will not execute the complete program in a single operation</p> <p>(2) Microprocessor will execute the program in single stepping mode</p> <p>(3) Microprocessor will execute the complete program in a single operation</p> <p>(4) Microprocessor will not execute the program in single stepping mode</p>
36.	<p>8051 is :</p> <p>(1) 16-bit microprocessor (2) 8-bit microcontroller</p> <p>(3) 16-bit microcontroller (4) 8-bit microprocessor</p>
37.	<p>Microcontroller has :</p> <p>(1) Parallel I/O interface (2) Memory</p> <p>(3) (1) and (2) (4) None</p>

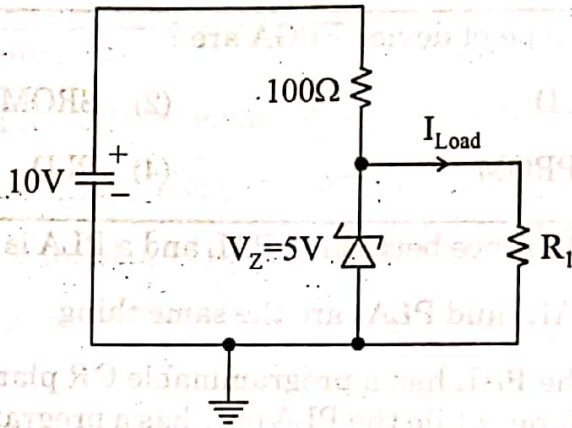
Question No.	Questions
38.	<p>The Special Function registers of Microcontrollers exists in :</p> <p>(1) On chip ROM (2) On chip RAM</p> <p>(3) On chip EPROM (4) None</p>
39.	<p>The microprocessor can work as computer :</p> <p>(1) With external digital parts</p> <p>(2) Without external digital parts</p> <p>(3) With ROM and RAM only</p> <p>(4) None of the above</p>
40.	<p>The CPU of 8051 contains :</p> <p>(1) Register A and B (2) Does not contain A and B</p> <p>(3) Contains A register only (4) Contains B register only</p>
41.	<p>A half wave rectifier is equivalent to :</p> <p>(1) Clamper circuit</p> <p>(2) Clipper circuit</p> <p>(3) Clamper circuit with negative bias</p> <p>(4) Clipper circuit with positive bias</p>
42.	<p>The operation of the BJT relies on _____</p> <p>(1) Free electrons (2) Holes</p> <p>(3) Both (1) and (2) (4) None of the above</p>

Question No.	Questions
43.	<p>The advantages of FET are _____</p> <p>(1) It has better thermal stability</p> <p>(2) It predicts less noise</p> <p>(3) It can be used at high frequency</p> <p>(4) All of the above</p>
44.	<p>A device with direct current coupled, high gain electronic voltage type amplifier with one output and differential input is called _____.</p> <p>(1) Rectifier (2) Amplifier</p> <p>(3) Transformer (4) Op-amp</p>
45.	<p>An op-amp with negative feedback provides _____ output parameter.</p> <p>(1) Gain (2) Bandwidth</p> <p>(3) Input-output impedance (4) All the above</p>
46.	<p>What is the function of low pass filter in phase-locked loop ?</p> <p>(1) Improves low frequency noise</p> <p>(2) Removes high frequency noise</p> <p>(3) Tracks the voltage changes</p> <p>(4) Changes the input frequency</p>
47.	<p>Which characteristic of PLL is defined as the range of frequencies over which PLL can acquire lock with the input signal ?</p> <p>(1) Free-running state (2) Pull-in time</p> <p>(3) Lock-in range (4) Capture range</p>

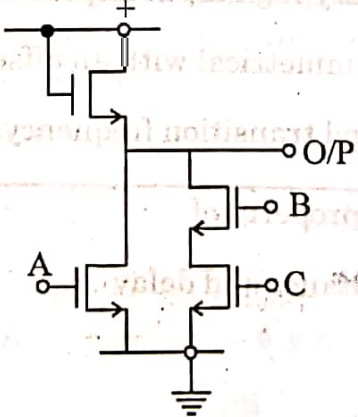
Question No.	Questions
48.	<p>A multivibrator that generates square wave of its own is called a :</p> <p>(1) Monostable multivibrator (2) Bistable multivibrator</p> <p>(3) Astable multivibrator (4) None of these</p>
49.	<p>Recommended frequency range of Harley oscillator is _____</p> <p>(1) 30 KHz–30 MHz (2) 1 KHz – 10 MHz</p> <p>(3) 2 Hz – 3 MHz (4) 0.5 KHz – 40 MHz</p>
50.	<p>The Hartley oscillator is less preferred than due to Colpitts oscillator's performance in</p> <p>(1) All frequency region (2) Mid frequency region</p> <p>(3) High frequency region (4) Low frequency region</p>
51.	<p>How can parallel data be taken out of a shift register simultaneously ?</p> <p>(1) Use the Q output of the first FF</p> <p>(2) Use the Q output of the last FF</p> <p>(3) Tie all of the Q outputs together</p> <p>(4) Use the Q output of each FF</p>
52.	<p>A logic circuit that accepts several data inputs and allows only one of them at a time to get through to the output is called</p> <p>(1) Multiplexer (2) De-multiplexer</p> <p>(3) Transmitter (4) Receiver</p>

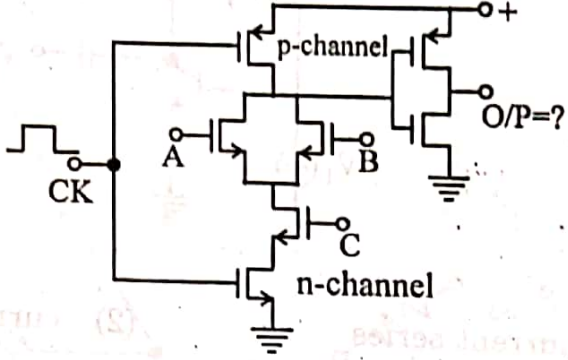
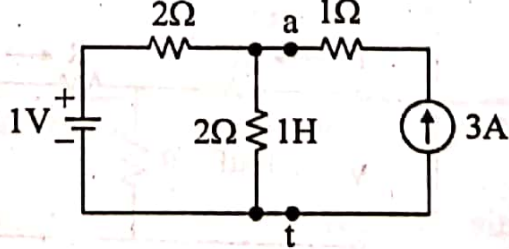
Question No.	Questions
53.	<p>The logical sum of two or more logical product terms is called :</p> <p>(1) SOP (2) POS</p> <p>(3) OR operation (4) NAND operation</p>
54.	<p>A finite state machine :</p> <p>(1) is same as that of abstract model of sequential circuit</p> <p>(2) consists of combinational logic circuits only</p> <p>(3) contains infinite number of memory devices</p> <p>(4) does not exist in practice</p>
55.	<p>The memory technology which needs the least power is</p> <p>(1) ECL (2) MOS</p> <p>(3) CMOS (4) TTL</p>
56.	<p>K-map is used to minimize the number of :</p> <p>(1) Flip-flops in digital circuits</p> <p>(2) Layout spaces in digital circuits for fabrication</p> <p>(3) Functions of 3, 4, 5 or 6 variables</p> <p>(4) Registers in CPU</p>
57.	<p>Master-Slave flip-flop is also called :</p> <p>(1) Pulse triggered flip-flop</p> <p>(2) Latch</p> <p>(3) Level triggered flip-flop</p> <p>(4) Buffer</p>

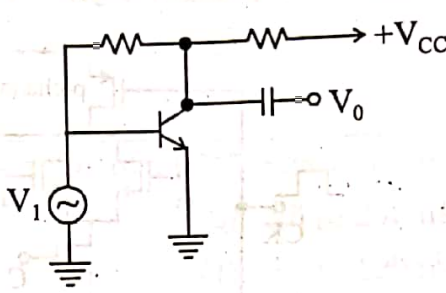
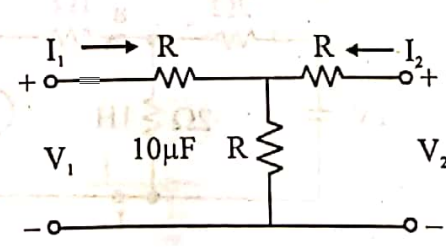
Question No.	Questions
58.	<p>The resolution of 6-bit DAC will be nearly :</p> <p>(1) 4.6% (2) 3.2%</p> <p>(3) 1.6% (4) 1.2%</p>
59.	<p>Which type of device FPGA are ?</p> <p>(1) SLD (2) SROM</p> <p>(3) EPROM (4) PLD</p>
60.	<p>The difference between a PAL and a PLA is</p> <p>(1) PALs and PLAs are the same thing</p> <p>(2) The PAL has a programmable OR plane and a programmable AND plane, while the PLA only has a programmable AND plane</p> <p>(3) The PLA has a programmable OR plane and a programmable AND plane, while the PAL only has a programmable AND plane</p> <p>(4) The PAL has more possible product terms than the PLA</p>
61.	<p>The diodes and capacitors in the circuit shown are ideal. The voltage $v(t)$ across the diode D_1 is</p>  <p>(1) $\cos(\omega t)$ (2) $1 - \cos(\omega t)$</p> <p>(3) $\sin(\omega t)$ (4) $1 - \sin(\omega t)$</p>

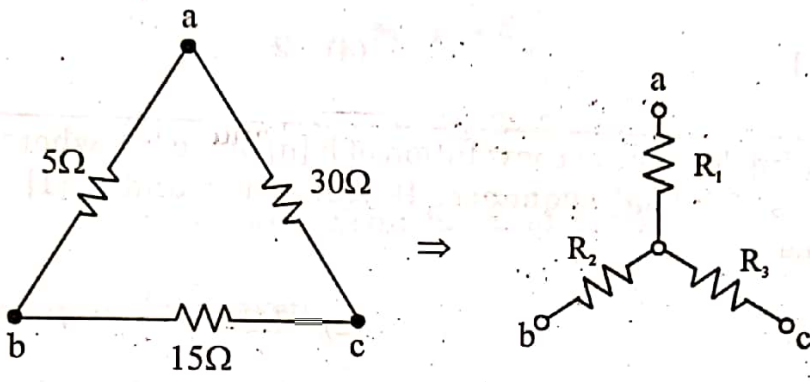
Question No.	Questions
62.	<p>In the circuit shown below, the knee current of the ideal Zener diode is 10 mA. To maintain 5 V across R_L, the minimum value of R_L in Ω and the minimum power rating of the Zener diode in mW, respectively are :</p>  <p>(1) 125 and 125 (2) 125 and 250 (3) 250 and 125 (4) 250 and 250</p>
63.	<p>Consider a common-emitter current gain of 150 and a base current of 15 μA. If the transistor is biased in the forward active mode, the collector and emitter current will be :</p> <p>(1) 2.25 mA and 2.27 mA (2) 3.25 mA and 2.27 mA (3) 2.25 mA and 1.37 mA (4) 3.25 mA and 1.37 mA</p>
64.	<p>What is the drain current for a D-MOSFET having the characteristic values I_{DSS} of 10 mA, $V_{GS(off)}$ of -4 V and I_{DSS} of $V_{GS} = +2$ V ?</p> <p>(1) 22.5 mA (2) 17.5 mA (3) 12.5 mA (4) 2.5 mA</p>

Question No.	Questions
65.	<p>Most of the linear ICs are based on the two-transistor differential amplifier because of its</p> <ul style="list-style-type: none"> (1) input voltage dependent linear transfer characteristic (2) high voltage gain (3) high input resistance (4) high CMRR
66.	<p>A dc power supply has no-load voltage of 30 V, and a full-load voltage of 25 V at full-load current of 1 A. Its output resistance and load regulation, respectively are</p> <ul style="list-style-type: none"> (1) 5 Ω and 20% (2) 25 Ω and 20% (3) 5 Ω and 16.7% (4) 25 Ω and 16.7%
67.	<p>NPN transistor is not suitable for good analog switch because</p> <ul style="list-style-type: none"> (1) IC – VCE characteristic curve pass directly through origin. (2) the device has very high input impedance (3) the device is asymmetrical with an offset voltage VCE off. (4) it has well defined transition frequency f_t.
68.	<p>CMOS logic has the property of</p> <ul style="list-style-type: none"> (1) increased capacitance and delay (2) decreased area (3) high noise margin (4) low static power dissipation

Question No.	Questions
69.	<p>In a transistor switch, the voltage change from base-to-emitter which is adequate to accomplish the switching is only about</p> <p>(1) 0.2 V (2) 0.3 V (3) 0.1 V (4) 0.5 V</p>
70.	<p>Typical propagation delay of a CMOS gate ranges from</p> <p>(1) 2 to 15 ns. (2) 25 to 150 ns. (3) 100 to 200 ns. (4) 80 to 120 ns.</p>
71.	<p>A silicon sample is uniformly doped with 1.0×10^6 phosphorous atoms/cm³ and 2×10^6 boron atoms/cm³. If all the dopants are fully ionized, the material is</p> <p>(1) n-type with carrier concentration of 10^6 cm⁻³ (2) p-type with carrier concentration of 10^6 cm⁻³ (3) p-type with carrier concentration of 2×10^{16} cm⁻³ (4) T2 will get damaged and T1 will be safe</p>
72.	<p>The CMOS equivalent of the following n MOS gate (in figure) is (draw the circuit)</p>  <p>(1) $(A + BC)'$ (2) $(A + B)(B + C)$ (3) $AB + BC$ (4) $AC + AB$</p>

Question No.	Questions
73.	<p>In figure, the Boolean expression for the output in terms of inputs A, B and C when the clock 'CK' is high, is given by _____</p>  <p>(1) $(A + B) C$ (2) $A.B.C$ (3) AC (4) AB</p>
74.	<p>The unit impulse response of a linear time invariant system is the unit step function $u(t)$. For $t > 0$, the response of the system of an excitation $e^{-at} u(t)$, $a > 0$</p> <p>(1) $a e^{-at}$ (2) $a (1 - e^{-at})$ (3) $(1 - e^{-at})$ (4) $1/a (1 - e^{-at})$</p>
75.	<p>The voltage across the terminals a and b in Fig.</p>  <p>(1) 0.5 V (2) 3 V (3) 3.5 V (4) 4 V</p>

Question No.	Questions
76.	<p>The circuit of Fig. is an example of feedback of the following type</p>  <p>(1) current series (2) current shunt (3) voltage series (4) voltage shunt</p>
77.	<p>The intrinsic impedane of copper at high frequencies is</p> <p>(1) purely resistive (2) purely inductive (3) complex with a capacitive component (4) complex with an inductive component</p>
78.	<p>A 2-port network is shown in Fig. the parameter h_{21} for this network can be given by</p>  <p>(1) $-1/2$ (2) $1/2$ (3) $(-3/2)$ (4) $3/2$</p>

Question No.	Questions
79.	<p>A Delta-connected network with its Wye-equivalent is shown in Fig. The resistance R_1, R_2 and R_3 (in ohms) are respectively</p>  <p>(1) 1.5, 3 and 9 (2) 3, 9 and 1.5</p> <p>(3) 9, 3 and 1.5 (4) 3, 1.5 and 9</p>
80.	<p>The Fourier Transform of the signal $x(t) = \delta(t)$ is of the following form,</p> <p>(1) 1 (2) 0</p> <p>(3) s (4) $1/s$</p>
81.	<p>The Hilbert transform of $\cos \omega_1 t + \sin \omega_1 t$</p> <p>(1) $\cos \omega_1 t + \sin \omega_1 t$ (2) $\cos \omega_1 t - \sin \omega_1 t$</p> <p>(3) $\sin \omega_1 t + \sin \omega_2 t$ (4) $\sin \omega_1 t - \sin \omega_2 t$</p>

Question No.	Questions
82.	<p>The Fourier transform of a signal $H(j\omega) = (2 \cos \omega) (\sin 2\omega)/\omega$</p> <p>(1) $1/4$ (2) $1/2$</p> <p>(3) 1 (4) 2</p>
83.	<p>Let $y[n]$ denote the convolution of $h[n]$ and $g[n]$, where $h(n) = (1/2)^n u(n)$, $g(n)$ is a causal sequence. If $y[0] = 1$ and $y[1] = 1/2$, then $g[1]$ equals</p> <p>(1) 0 (2) $1/2$</p> <p>(3) 1 (4) $3/2$</p>
84.	<p>The trigonometric Fourier series of an even function does not have the</p> <p>(1) dc term (2) cosine terms</p> <p>(3) sine terms (4) odd harmonic terms</p>
85.	<p>A system is defined by its impulse response $h(n) = 2^n u(n-2)$. The system is</p> <p>(1) stable and causal</p> <p>(2) causal but not stable</p> <p>(3) stable but not causal</p> <p>(4) unstable and non-causal</p>

Question No.	Questions
86.	<p>The first six points of the 8-point DFT of a real valued sequence are 5, $1 - j3$, $03 - 4j$, 0 and $3 + 4j$. The last two points of the DFT are respectively</p> <p>(1) $0, 1 - j$ (2) $0, 1 + j$ (3) $1 + 3j, 5$ (4) $1 - 3j, 5$</p>
87.	<p>The Fourier series of a real periodic function has only</p> <p>(1) cosine terms if it is even (2) sine terms if it is even (3) cosine terms if it is odd (4) sine terms if it is odd</p>
88.	<p>The ROC of z-transform of the discrete time sequence</p> $X(n) = (1/3)^n - (1/2)^n u(-n - 1)$ <p>(1) $1/3 < z < 1/2$ (2) $z > 1/2$ (3) $z > 1/2$ (4) $3 < z < 2$</p>
89.	<p>The 4-point Discrete Fourier Transform (DFT) of a discrete time sequence $\{1, 0, 2, 3\}$ is</p> <p>(1) $[0, -2 + 2j, 2, -2 - 2j]$ (2) $[2, 2 + 2j, 6, 2 - 2j]$ (3) $[6, 1 - 3j, 2, 1 + 3j]$ (4) $[6, -1 + 3j, 0, -1 - 3j]$</p>

Question No.	Questions
90.	<p>The input and output of a continuous time system are respectively denoted by $x(t)$ and $y(t)$. Which of the following descriptions corresponds to a causal system</p> <p>(1) $y(t) = x(t-2) + x(t+2)$</p> <p>(2) $y(t) = (t+5)x(t+5)$</p> <p>(3) $y(t) = (t-4)(t+1)$</p> <p>(4) $y(t) = (t+5)x(t+5)$</p>
91.	<p>In digital transmission, the modulation technique that requires minimum bandwidth is</p> <p>(1) Delta modulation (2) PCM</p> <p>(3) DPCM (4) PAM</p>
92.	<p>In Differential Pulse Code Modulation techniques, the decoding is performed by</p> <p>(1) PLL (2) Accumulator</p> <p>(3) Sampler (4) Quantizer</p>
93.	<p>The noise that affects PCM</p> <p>(1) Transmission noise</p> <p>(2) Quantizing noise</p> <p>(3) Transit noise</p> <p>(4) Both (1) and (2) are correct</p>

Question No.	Questions
94.	Matched filter may be optimally used only for (1) Flicker (2) Transit time noise (3) Gaussian noise (4) All of the above
95.	Regenerative repeaters are used for (1) Eliminating noise (2) Reconstruction of signals (3) Transmission over long distances (4) All of the above
96.	The technique that may be used to increase average information per bit is (1) FSK (2) ASK (3) Shannon-Fano algorithm (4) Digital modulation techniques
97.	ISI may be removed by using (1) Differential coding (2) Manchester coding (3) Polar NRZ (4) None of the above

Question No.	Questions
98.	<p>The code in convolution coding is generated using</p> <p>(1) EX-OR logic</p> <p>(2) AND logic</p> <p>(3) OR logic</p> <p>(4) None of the above</p>
99.	<p>Parity check bit coding is used for</p> <p>(1) Error correction</p> <p>(2) Error detection</p> <p>(3) Error correction and detection</p> <p>(4) None of the above</p>
100.	<p>In MSK, the difference between the higher and lower frequency is</p> <p>(1) Same as the bit rate</p> <p>(2) Half of the bit rate</p> <p>(3) Twice of the bit rate</p> <p>(4) Four time the bit rate</p>

SET-“Z”

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(Ph.D/URS-EE Jan. 2022)

Code



**ELECTRONICS & COMMUNICATION
ENGINEERING**

Sr. No. 10006

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Father's Name : _____

Mother's Name : _____ Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/
INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.**

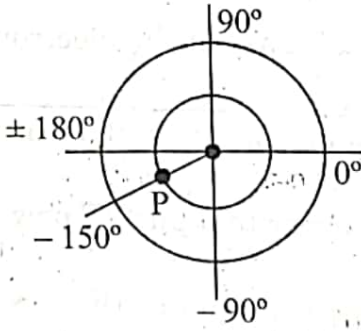
1. All questions are compulsory.
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A,B,C and D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E-Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	<p>A half wave rectifier is equivalent to :</p> <p>(1) Clamper circuit</p> <p>(2) Clipper circuit</p> <p>(3) Clamper circuit with negative bias</p> <p>(4) Clipper circuit with positive bias</p>
2.	<p>The operation of the BJT relies on _____</p> <p>(1) Free electrons (2) Holes</p> <p>(3) Both (1) and (2) (4) None of the above</p>
3.	<p>The advantages of FET are _____</p> <p>(1) It has better thermal stability</p> <p>(2) It predicts less noise</p> <p>(3) It can be used at high frequency</p> <p>(4) All of the above</p>
4.	<p>A device with direct current coupled, high gain electronic voltage type amplifier with one output and differential input is called _____.</p> <p>(1) Rectifier (2) Amplifier</p> <p>(3) Transformer (4) Op-amp</p>
5.	<p>An op-amp with negative feedback provides _____ output parameter.</p> <p>(1) Gain (2) Bandwidth</p> <p>(3) Input-output impedance (4) All the above</p>

Question No.	Questions
6.	<p>What is the function of low pass filter in phase-locked loop ?</p> <p>(1) Improves low frequency noise (2) Removes high frequency noise (3) Tracks the voltage changes (4) Changes the input frequency</p>
7.	<p>Which characteristic of PLL is defined as the range of frequencies over which PLL can acquire lock with the input signal ?</p> <p>(1) Free-running state (2) Pull-in time (3) Lock-in range (4) Capture range</p>
8.	<p>A multivibrator that generates square wave of its own is called a :</p> <p>(1) Monostable multivibrator (2) Bistable multivibrator (3) Astable multivibrator (4) None of these</p>
9.	<p>Recommended frequency range of Harley oscillator is _____</p> <p>(1) 30 KHz–30 MHz (2) 1 KHz – 10 MHz (3) 2 Hz – 3 MHz (4) 0.5 KHz – 40 MHz</p>
10.	<p>The Hartley oscillator is less preferred than due to Colpitts oscillator's performance in</p> <p>(1) All frequency region (2) Mid frequency region (3) High frequency region (4) Low frequency region</p>

Question No.	Questions
11.	<p>$E \times H$ of microwave gives</p> <p>(1) Instantaneous power (2) Average power</p> <p>(3) Peak power (4) Reactive power</p>
12.	<p>In a dielectric medium</p> <p>(1) $\nabla \times H = J$ (2) $\nabla \times H = D$</p> <p>(3) $\nabla \times H = 0$ (4) $\nabla \times H = \rho_v$</p>
13.	<p>The velocity of electron in klystron is proportional to :</p> <p>(1) Square root of beam voltage</p> <p>(2) Electron charge</p> <p>(3) Electron mass</p> <p>(4) Square root of mass of the electron</p>
14.	<p>The output efficiency of reflex klystron is the ratio of :</p> <p>(1) Output RF power to input RF power</p> <p>(2) Output RF power to input DC power</p> <p>(3) Output DC power to input DC power</p> <p>(4) Output DC power to RF input power</p>

Question No.	Questions
15.	<p>An EM field is said to be non-existent or not Maxwellian if it fails to satisfy Maxwell's equations and the wave equations derived from them. Which of the following fields in free space are not Maxwellian?</p> <p>(1) $H = \cos x \cos 10^6 t a_x$ (2) $E = 100 \cos wt a_x$</p> <p>(3) $D = e^{-10y} \sin (10^5 t - 10y) a_z$ (4) $B = 0.4 \sin 10^4 t a_z$</p>
16.	<p>S-matrix exists for</p> <p>(1) Two ports only (2) Three ports only</p> <p>(3) Multiport network (4) Four ports</p>
17.	<p>A 500 m lossless transmission line is terminated by a load that is located at P on the Smith chart of Figure given below. If $\lambda = 150$ m, how many voltage maxima exist on the line?</p>  <p>(1) 7 (2) 6</p> <p>(3) 5 (4) 3</p>

Question No.	Questions
18.	<p>How many degenerate dominant modes exist in a rectangular resonant cavity for which $a = b = c$?</p> <p>(1) 2 (2) 3</p> <p>(3) 5 (4) ∞</p>
19.	<p>If a small single turn loop antenna has a radiation resistance of 0.04Ω, how many turns are needed to produce a radiation resistance of 1Ω ?</p> <p>(1) 150 (2) 50</p> <p>(3) 25 (4) 5</p>
20.	<p>Magic Tee can produce</p> <p>(1) Sum and difference of signals</p> <p>(2) Oscillations</p> <p>(3) Only sum of signals</p> <p>(4) Only difference of signals</p>
21.	<p>SCR stand for</p> <p>(1) Silicon Current Rectifier (2) Silicon Convert Rectifier</p> <p>(3) Silicon Controlled Rectifier (4) None of these</p>
22.	<p>TRAIC is</p> <p>(1) Unidirectional thyristor (2) Bidirectional thyristor</p> <p>(3) Tri-directional thyristor (4) None of these</p>

Question No.	Questions
23.	Which statement is correct ? (1) SCR is three junction and four layers semiconductor device (2) SCR is two junction and four layers semiconductor device (3) SCR is three junction and two layers semiconductor device (4) SCR is four junction and three layers semiconductor device
24.	The dv/dt protection of SCR is achieved by using (1) RL circuit in series with SCR (2) RC circuit across SCR (3) L in series with SCR (4) RC circuit in series with SCR
25.	Which component is required to increase the switching speed in SMPA ? (1) MOSFET (2) SCR (3) Transistor (4) All of these
26.	If all the poles of the system lie in the left half of s-plane then system is (1) Unstable (2) Marginally stable (3) Stable (4) None of these
27.	The step size of stepper motor with 10 rotor tooth is (1) 36° (2) 45° (3) 25° (4) 26°

Question No.	Questions
28.	<p>Transfer function is defined as</p> <p>(1) Linear and time variant system</p> <p>(2) Linear and invariant system</p> <p>(3) Non-linear and time variant system</p> <p>(4) Non-linear and time invariant system</p>
29.	<p>The main drawback of feedback system</p> <p>(1) Inaccuracy (2) Inefficiency</p> <p>(3) Insensitivity (4) Instability</p>
30.	<p>Which of the following statement is correct ?</p> <p>(1) Proportional-Derivative (PD) controller is equivalent to high pass filter</p> <p>(2) For better performance, integral action is initiated before derivative action</p> <p>(3) A practical PID controller uses a high gain amplifier in the forward path</p> <p>(4) High proportional gain is an alternative to derivative actions</p>
31.	<p>In digital transmission, the modulation technique that requires minimum bandwidth is</p> <p>(1) Delta modulation (2) PCM</p> <p>(3) DPCM (4) PAM</p>
32.	<p>In Differential Pulse Code Modulation techniques, the decoding is performed by</p> <p>(1) PLL (2) Accumulator</p> <p>(3) Sampler (4) Quantizer</p>

Question No.	Questions
33.	<p>The noise that affects PCM</p> <p>(1) Transmission noise</p> <p>(2) Quantizing noise</p> <p>(3) Transit noise</p> <p>(4) Both (1) and (2) are correct</p>
34.	<p>Matched filter may be optimally used only for</p> <p>(1) Flicker (2) Transit time noise</p> <p>(3) Gaussian noise (4) All of the above</p>
35.	<p>Regenerative repeaters are used for</p> <p>(1) Eliminating noise</p> <p>(2) Reconstruction of signals</p> <p>(3) Transmission over long distances</p> <p>(4) All of the above</p>
36.	<p>The technique that may be used to increase average information per bit is</p> <p>(1) FSK</p> <p>(2) ASK</p> <p>(3) Shannon-Fano algorithm</p> <p>(4) Digital modulation techniques</p>

Question No.	Questions
37.	ISI may be removed by using (1) Differential coding (2) Manchester coding (3) Polar NRZ (4) None of the above
38.	The code in convolution coding is generated using (1) EX-OR logic (2) AND logic (3) OR logic (4) None of the above
39.	Parity check bit coding is used for (1) Error correction (2) Error detection (3) Error correction and detection (4) None of the above
40.	In MSK, the difference between the higher and lower frequency is (1) Same as the bit rate (2) Half of the bit rate (3) Twice of the bit rate (4) Four time the bit rate

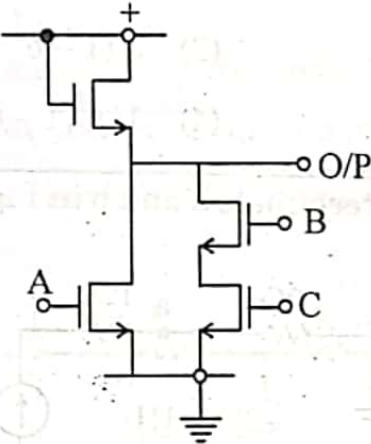
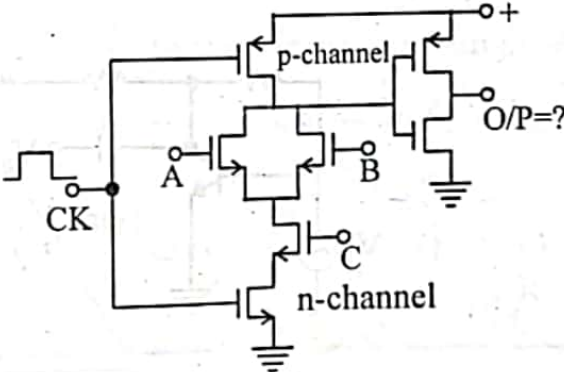
Question No.	Questions
41.	<p>The diodes and capacitors in the circuit shown are ideal. The voltage $v(t)$ across the diode D1 is</p> <div style="display: flex; justify-content: space-around;"> (1) $\cos(\omega t)$ (2) $1 - \cos(\omega t)$ </div> <div style="display: flex; justify-content: space-around;"> (3) $\sin(\omega t)$ (4) $1 - \sin(\omega t)$ </div>
42.	<p>In the circuit shown below, the knee current of the ideal Zener diode is 10 mA. To maintain 5 V across RL, the minimum value of RL in Ω and the minimum power rating of the Zener diode in mW, respectively are :</p> <div style="display: flex; justify-content: space-around;"> (1) 125 and 125 (2) 125 and 250 </div> <div style="display: flex; justify-content: space-around;"> (3) 250 and 125 (4) 250 and 250 </div>

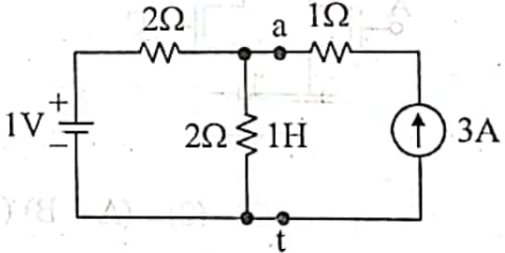
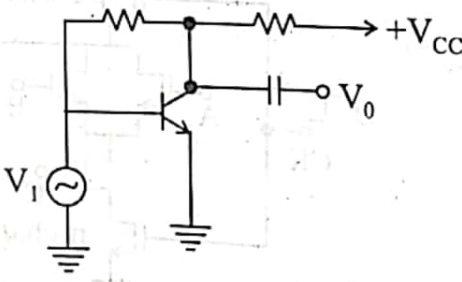
Question No.	Questions
43.	<p>Consider a common-emitter current gain of 150 and a base current of $15 \mu\text{A}$. If the transistor is biased in the forward active mode, the collector and emitter current will be :</p> <p>(1) 2.25 mA and 2.27 mA (2) 3.25 mA and 2.27 mA</p> <p>(3) 2.25 mA and 1.37 mA (4) 3.25 mA and 1.37 mA</p>
44.	<p>What is the drain current for a D-MOSFET having the characteristic values I_{DSS} of 10 mA, $V_{GS}(\text{off})$ of -4 V and I_{DSS} of $V_{GS} = +2 \text{ V}$?</p> <p>(1) 22.5 mA (2) 17.5 mA</p> <p>(3) 12.5 mA (4) 2.5 mA</p>
45.	<p>Most of the linear ICs are based on the two-transistor differential amplifier because of its</p> <p>(1) input voltage dependent linear transfer characteristic</p> <p>(2) high voltage gain</p> <p>(3) high input resistance</p> <p>(4) high CMRR</p>
46.	<p>A dc power supply has no-load voltage of 30 V, and a full-load voltage of 25 V at full-load current of 1 A. Its output resistance and load regulation, respectively are</p> <p>(1) 5Ω and 20% (2) 25Ω and 20%</p> <p>(3) 5Ω and 16.7% (4) 25Ω and 16.7%</p>

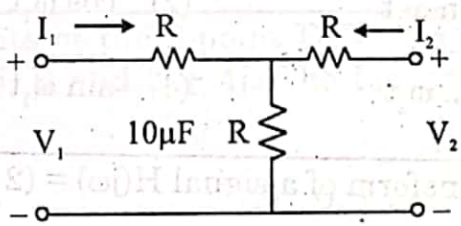
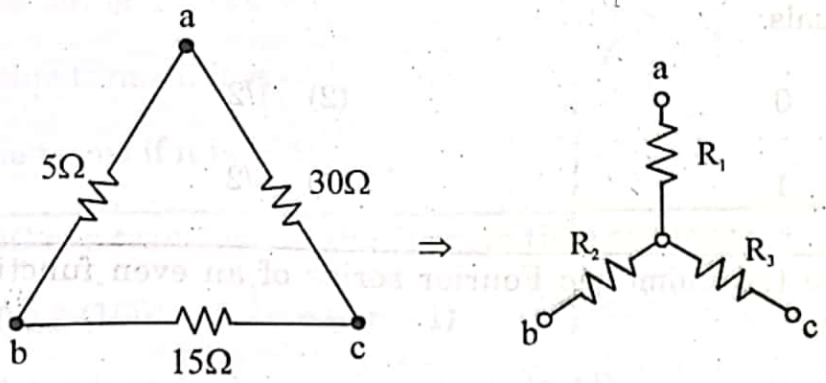
PHD/URS-EE-2022 (Electronics & Communication Engineering) Code-B
(12)

Question No.	Questions
52.	8086 microprocessor is designed to operate in how many modes ? (1) Two (2) Four (3) Eight (4) Sixteen
53.	Data pins of 16 bit ALU of 8086 is : (1) AD_{16} to AD_1 (2) AD_{15} to AD_0 (3) AD_{15} to AD_1 (4) AD_{16} to AD_0
54.	Pointer register of 8086 is : (1) Base pointer (2) Index pointer (3) Segment pointer (4) Stack segment pointer
55.	For TRAP FLAG (TF = 0) in 8086 : (1) Microprocessor will not execute the complete program in a single operation (2) Microprocessor will execute the program in single stepping mode (3) Microprocessor will execute the complete program in a single operation (4) Microprocessor will not execute the program in single stepping mode
56.	8051 is : (1) 16-bit microprocessor (2) 8-bit microcontroller (3) 16-bit microcontroller (4) 8-bit microprocessor

Question No.	Questions
57.	Microcontroller has : (1) Parallel I/O interface (2) Memory (3) (1) and (2) (4) None
58.	The Special Function registers of Microcontrollers exists in : (1) On chip ROM (2) On chip RAM (3) On chip EPROM (4) None
59.	The microprocessor can work as computer : (1) With external digital parts (2) Without external digital parts (3) With ROM and RAM only (4) None of the above
60.	The CPU of 8051 contains : (1) Register A and B (2) Does not contain A and B (3) Contains A register only (4) Contains B register only
61.	A silicon sample is uniformly doped with 1.0×10^6 phosphorous atoms/cm ³ and 2×10^6 boron atoms/cm ³ . If all the dopants are fully ionized, the material is (1) n-type with carrier concentration of 10^6 cm (2) p-type with carrier concentration of 10^6 cm (3) p-type with carrier concentration of 2×10^{16} cm (4) T2 will get damaged and T1 will be safe

Question No.	Questions
62.	<p>The CMOS equivalent of the following n MOS gate (in figure) is _____ (draw the circuit)</p>  <p>(1) $(A + BC)'$ (2) $(A + B)(B + C)$</p> <p>(3) $AB + BC$ (4) $AC + AB$</p>
63.	<p>In figure, the Boolean expression for the output in terms of inputs A, B and C when the clock 'CK' is high, is given by _____</p>  <p>(1) $(A + B)C$ (2) $A.B.C$</p> <p>(3) AC (4) AB</p>

Question No.	Questions
64.	<p>The unit impulse response of a linear time invariant system is the unit step function $u(t)$. For $t > 0$, the response of the system of an excitation $e^{-at} u(t)$, $a > 0$</p> <p>(1) $a e^{-at}$ (2) $a (1 - e^{-at})$ (3) $(1 - e^{-at})$ (4) $1/a (1 - e^{-at})$</p>
65.	<p>The voltage across the terminals a and b in Fig.</p>  <p>(1) 0.5 V (2) 3 V (3) 3.5 V (4) 4 V</p>
66.	<p>The circuit of Fig. is an example of feedback of the following type</p>  <p>(1) current series (2) current shunt (3) voltage series (4) voltage shunt</p>

Question No.	Questions
67.	<p>The intrinsic impedane of copper at high frequencies is</p> <p>(1) purely resistive</p> <p>(2) purely inductive</p> <p>(3) complex with a capacitive component</p> <p>(4) complex with an inductive component</p>
68.	<p>A 2-port network is shown in Fig. the parameter h_{21} for this network can be given by</p>  <p>(1) $-1/2$ (2) $1/2$</p> <p>(3) $(-3/2)$ (4) $3/2$</p>
69.	<p>A Delta-connected network with its Wye-equivalent is shown in Fig. The resistance R_1, R_2 and R_3 (in ohms) are respectively</p>  <p>(1) 1.5, 3 and 9 (2) 3, 9 and 1.5</p> <p>(3) 9, 3 and 1.5 (4) 3, 1.5 and 9</p>

Question No.	Questions
70.	<p>The Fourier Transform of the signal $x(t) = \delta(t)$ is of the following form,</p> <p>(1) 1 (2) 0</p> <p>(3) s (4) $1/s$</p>
71.	<p>The Hilbert transform of $\cos \omega_1 t + \sin \omega_1 t$</p> <p>(1) $\cos \omega_1 t + \sin \omega_1 t$ (2) $\cos \omega_1 t - \sin \omega_1 t$</p> <p>(3) $\sin \omega_1 t + \sin \omega_2 t$ (4) $\sin \omega_1 t - \sin \omega_2 t$</p>
72.	<p>The Fourier transform of a signal $H(j\omega) = (2 \cos \omega) (\sin 2\omega)/\omega$</p> <p>(1) $1/4$ (2) $1/2$</p> <p>(3) 1 (4) 2</p>
73.	<p>Let $y[n]$ denote the convolution of $h[n]$ and $g[n]$, where $h(n) = (1/2)^n u(n)$, $g(n)$ is a causal sequence. If $y[0] = 1$ and $y[1] = 1/2$, then $g[1]$ equals</p> <p>(1) 0 (2) $1/2$</p> <p>(3) 1 (4) $3/2$</p>
74.	<p>The trigonometric Fourier series of an even function does not have the</p> <p>(1) dc term (2) cosine terms</p> <p>(3) sine terms (4) odd harmonic terms</p>

Question No.	Questions
75.	A system is defined by its impulse response $h(n) = 2^n u(n - 2)$. The system is (1) stable and causal (2) causal but not stable (3) stable but not causal (4) unstable and non-causal
76.	The first six points of the 8-point DFT of a real valued sequence are 5, $1 - j3$, $0.3 - 4j$, 0 and $3 + 4j$. The last two points of the DFT are respectively (1) 0, $1 - j$ (2) 0, $1 + j$ (3) $1 + 3j$, 5 (4) $1 - 3j$, 5
77.	The Fourier series of a real periodic function has only (1) cosine terms if it is even (2) sine terms if it is even (3) cosine terms if it is odd (4) sine terms if it is odd
78.	The ROC of z-transform of the discrete time sequence $X(n) = (1/3)^n - (1/2)^n u(-n - 1)$ (1) $1/3 < z < 1/2$ (2) $ z > 1/2$ (3) $ z > 1/2$ (4) $3 < z < 2$

Question No.	Questions
79.	<p>The 4-point Discrete Fourier Transform (DFT) of a discrete time sequence $\{1, 0, 2, 3\}$ is</p> <p>(1) $[0, -2 + 2j, 2, -2 - 2j]$ (2) $[2, 2 + 2j, 6, 2 - 2j]$</p> <p>(3) $[6, 1 - 3j, 2, 1 + 3j]$ (4) $[6, -1 + 3j, 0, -1 - 3j]$</p>
80.	<p>The input and output of a continuous time system are respectively denoted by $x(t)$ and $y(t)$. Which of the following descriptions corresponds to a causal system</p> <p>(1) $y(t) = x(t - 2) + x(t + 2)$</p> <p>(2) $y(t) = (t + 5)x(t + 5)$</p> <p>(3) $y(t) = (t - 4)(t + 1)$</p> <p>(4) $y(t) = (t + 5)x(t + 5)$</p>
81.	<p>A zero to 300 V voltmeter has a guaranteed accuracy of 1% full scale reading. The voltage measured by the instruments is 83 V. The percent limiting error is</p> <p>(1) 0.67 (2) 2.63</p> <p>(3) 3.62 (4) 1.67</p>
82.	<p>Frequency can be measured by using</p> <p>(1) Maxwell's bridge (2) Wein's bridge</p> <p>(3) Schering bridge (4) None of these</p>

Question No.	Questions
83.	A linear displacement transducer (such as digital) is generally uses (1) Gray Code (2) Binary code (3) Excess 3 code (4) Octal code
84.	Hall effect transducer is applicable for such type of measurement like (1) Power (2) Displacement (3) Current (4) All of these
85.	Which type of detector is used in ac bridges for audio frequency range ? (1) AC voltmeter (2) CRO (3) Headphone (4) Vibration galvanometer
86.	Which of the following optical transducers used is an active transducer ? (1) Photo voltaic cell (2) Photo emission cell (3) Photo diode (4) Photo transistor
87.	A compensated wattmeter has its reading corrected for the error due to (1) Friction (2) Frequency (3) Power consumed due to load (4) Power consumed in potential coil

Question No.	Questions
88.	<p>A dual beam CRO has</p> <ul style="list-style-type: none"> (1) Two horizontal amplifiers (2) Two trigger circuits (3) Two vertical amplifiers (4) All the above
89.	<p>A template matching is performed on an EEG signal with spike and wave by matched filter. Which of the following statements are true ?</p> <ul style="list-style-type: none"> (1) Peaks in the filter response represent the presence of alpha wave (2) Peaks in the filter response represent the presence of spike and wave complexes (3) Matched filter does not cause a lag in the output (4) None of these
90.	<p>Internet of Things IoT is a network of</p> <ul style="list-style-type: none"> (1) Sensors (2) Controllers (3) Actuators (4) All the above
91.	<p>How can parallel data be taken out of a shift register simultaneously ?</p> <ul style="list-style-type: none"> (1) Use the Q output of the first FF (2) Use the Q output of the last FF (3) Tie all of the Q outputs together (4) Use the Q output of each FF

Question No.	Questions
92.	<p>A logic circuit that accepts several data inputs and allows only one of them at a time to get through to the output is called</p> <p>(1) Multiplexer (2) De-multiplexer</p> <p>(3) Transmitter (4) Receiver</p>
93.	<p>The logical sum of two or more logical product terms is called :</p> <p>(1) SOP (2) POS</p> <p>(3) OR operation (4) NAND operation</p>
94.	<p>A finite state machine :</p> <p>(1) is same as that of abstract model of sequential circuit</p> <p>(2) consists of combinational logic circuits only</p> <p>(3) contains infinite number of memory devices</p> <p>(4) does not exist in practice</p>
95.	<p>The memory technology which needs the least power is</p> <p>(1) ECL (2) MOS</p> <p>(3) CMOS (4) TTL</p>
96.	<p>K-map is used to minimize the number of :</p> <p>(1) Flip-flops in digital circuits</p> <p>(2) Layout spaces in digital circuits for fabrication</p> <p>(3) Functions of 3, 4, 5 or 6 variables</p> <p>(4) Registers in CPU</p>

Question No.	Questions
97.	Master-Slave flip-flop is also called : (1) Pulse triggered flip-flop (2) Latch (3) Level triggered flip-flop (4) Buffer
98.	The resolution of 6-bit DAC will be nearly : (1) 4.6% (2) 3.2% (3) 1.6% (4) 1.2%
99.	Which type of device FPGA are ? (1) SLD (2) SROM (3) EPROM (4) PLD
100.	The difference between a PAL and a PLA is (1) PALs and PLAs are the same thing (2) The PAL has a programmable OR plane and a programmable AND plane, while the PLA only has a programmable AND plane (3) The PLA has a programmable OR plane and a programmable AND plane, while the PAL only has a programmable AND plane (4) The PAL has more possible product terms than the PLA

SET-“Z”

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(Ph.D/URS-EE Jan. 2022)

10003

Code



**ELECTRONICS & COMMUNICATION
ENGINEERING**

Sr. No. _____

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Father's Name : _____

Mother's Name : _____ Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/
INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.**

1. All questions are compulsory.
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A,B,C and D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E-Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	A zero to 300 V voltmeter has a guaranteed accuracy of 1% full scale reading. The voltage measured by the instruments is 83 V. The percent limiting error is <div style="display: flex; justify-content: space-between;"> (1) 0.67 (2) 2.63 </div> <div style="display: flex; justify-content: space-between;"> (3) 3.62 (4) 1.67 </div>
2.	Frequency can be measured by using <div style="display: flex; justify-content: space-between;"> (1) Maxwell's bridge (2) Wein's bridge </div> <div style="display: flex; justify-content: space-between;"> (3) Schering bridge (4) None of these </div>
3.	A linear displacement transducer (such as digital) is generally uses <div style="display: flex; justify-content: space-between;"> (1) Gray Code (2) Binary code </div> <div style="display: flex; justify-content: space-between;"> (3) Excess 3 code (4) Octal code </div>
4.	Hall effect transducer is applicable for such type of measurement like <div style="display: flex; justify-content: space-between;"> (1) Power (2) Displacement </div> <div style="display: flex; justify-content: space-between;"> (3) Current (4) All of these </div>
5.	Which type of detector is used in ac bridges for audio frequency range ? <div style="display: flex; justify-content: space-between;"> (1) AC voltmeter (2) CRO </div> <div style="display: flex; justify-content: space-between;"> (3) Headphone (4) Vibration galvanometer </div>

Question No.	Questions
6.	<p>Which of the following optical transducers used is an active transducer ?</p> <p>(1) Photo voltaic cell (2) Photo emission cell</p> <p>(3) Photo diode (4) Photo transistor</p>
7.	<p>A compensated wattmeter has its reading corrected for the error due to</p> <p>(1) Friction</p> <p>(2) Frequency</p> <p>(3) Power consumed due to load</p> <p>(4) Power consumed in potential coil</p>
8.	<p>A dual beam CRO has</p> <p>(1) Two horizontal amplifiers</p> <p>(2) Two trigger circuits</p> <p>(3) Two vertical amplifiers</p> <p>(4) All the above</p>
9.	<p>A template matching is performed on an EEG signal with spike and wave by matched filter. Which of the following statements are true ?</p> <p>(1) Peaks in the filter response represent the presence of alpha wave</p> <p>(2) Peaks in the filter response represent the presence of spike and wave complexes</p> <p>(3) Matched filter does not cause a lag in the output</p> <p>(4) None of these</p>

Question No.	Questions
15.	<p>Regenerative repeaters are used for</p> <ul style="list-style-type: none"> (1) Eliminating noise (2) Reconstruction of signals (3) Transmission over long distances (4) All of the above
16.	<p>The technique that may be used to increase average information per bit is</p> <ul style="list-style-type: none"> (1) FSK (2) ASK (3) Shannon-Fano algorithm (4) Digital modulation techniques
17.	<p>ISI may be removed by using</p> <ul style="list-style-type: none"> (1) Differential coding (2) Manchester coding (3) Polar NRZ (4) None of the above
18.	<p>The code in convolution coding is generated using</p> <ul style="list-style-type: none"> (1) EX-OR logic (2) AND logic (3) OR logic (4) None of the above

Question No.	Questions
19.	<p>Parity check bit coding is used for</p> <ul style="list-style-type: none"> (1) Error correction (2) Error detection (3) Error correction and detection (4) None of the above
20.	<p>In MSK, the difference between the higher and lower frequency is</p> <ul style="list-style-type: none"> (1) Same as the bit rate (2) Half of the bit rate (3) Twice of the bit rate (4) Four time the bit rate
21.	<p>A silicon sample is uniformly doped with 1.0×10^6 phosphorous atoms/cm³ and 2×10^6 boron atoms/cm³. If all the dopants are fully ionized, the material is</p> <ul style="list-style-type: none"> (1) n-type with carrier concentration of 10^6 cm (2) p-type with carrier concentration of 10^6 cm (3) p-type with carrier concentration of 2×10^{16} cm (4) T2 will get damaged and T1 will be safe

Question No.	Questions
30.	The Fourier Transform of the signal $x(t) = \delta(t)$ is of the following form, <div style="display: flex; justify-content: space-around;"> (1) 1 (2) 0 </div> <div style="display: flex; justify-content: space-around;"> (3) s (4) 1/s </div>
31.	How can parallel data be taken out of a shift register simultaneously ? <div style="display: flex; flex-direction: column;"> <div>(1) Use the Q output of the first FF</div> <div>(2) Use the Q output of the last FF</div> <div>(3) Tie all of the Q outputs together</div> <div>(4) Use the Q output of each FF</div> </div>
32.	A logic circuit that accepts several data inputs and allows only one of them at a time to get through to the output is called <div style="display: flex; justify-content: space-around;"> (1) Multiplexer (2) De-multiplexer </div> <div style="display: flex; justify-content: space-around;"> (3) Transmitter (4) Receiver </div>
33.	The logical sum of two or more logical product terms is called : <div style="display: flex; justify-content: space-around;"> (1) SOP (2) POS </div> <div style="display: flex; justify-content: space-around;"> (3) OR operation (4) NAND operation </div>
34.	A finite state machine : <div style="display: flex; flex-direction: column;"> <div>(1) is same as that of abstract model of sequential circuit</div> <div>(2) consists of combinational logic circuits only</div> <div>(3) contains infinite number of memory devices</div> <div>(4) does not exist in practice</div> </div>

Question No.	Questions
35.	<p>The memory technology which needs the least power is</p> <p>(1) ECL (2) MOS</p> <p>(3) CMOS (4) TTL</p>
36.	<p>K-map is used to minimize the number of :</p> <p>(1) Flip-flops in digital circuits</p> <p>(2) Layout spaces in digital circuits for fabrication</p> <p>(3) Functions of 3, 4, 5 or 6 variables</p> <p>(4) Registers in CPU</p>
37.	<p>Master-Slave flip-flop is also called :</p> <p>(1) Pulse triggered flip-flop</p> <p>(2) Latch</p> <p>(3) Level triggered flip-flop</p> <p>(4) Buffer</p>
38.	<p>The resolution of 6-bit DAC will be nearly :</p> <p>(1) 4.6% (2) 3.2%</p> <p>(3) 1.6% (4) 1.2%</p>
39.	<p>Which type of device FPGA are ?</p> <p>(1) SLD (2) SRAM</p> <p>(3) EPROM (4) PLD</p>

Question No.	Questions
40.	<p>The difference between a PAL and a PLA is</p> <ol style="list-style-type: none"> (1) PALs and PLAs are the same thing (2) The PAL has a programmable OR plane and a programmable AND plane, while the PLA only has a programmable AND plane (3) The PLA has a programmable OR plane and a programmable AND plane, while the PAL only has a programmable AND plane (4) The PAL has more possible product terms than the PLA
41.	<p>In 8086 microprocessor, address range of memory is</p> <ol style="list-style-type: none"> (1) 00000 H – CCCCC H (2) 00001 H – FFFFF H (3) 00001 H – CCCCC H (4) 00000 H – FFFFF H
42.	<p>8086 microprocessor is designed to operate in how many modes ?</p> <ol style="list-style-type: none"> (1) Two (2) Four (3) Eight (4) Sixteen
43.	<p>Data pins of 16 bit ALU of 8086 is :</p> <ol style="list-style-type: none"> (1) AD_{16} to AD_1 (2) AD_{15} to AD_0 (3) AD_{15} to AD_1 (4) AD_{16} to AD_0
44.	<p>Pointer register of 8086 is :</p> <ol style="list-style-type: none"> (1) Base pointer (2) Index pointer (3) Segment pointer (4) Stack segment pointer

Question No.	Questions
45.	<p>For TRAP FLAG (TF = 0) in 8086 :</p> <p>(1) Microprocessor will not execute the complete program in a single operation</p> <p>(2) Microprocessor will execute the program in single stepping mode</p> <p>(3) Microprocessor will execute the complete program in a single operation</p> <p>(4) Microprocessor will not execute the program in single stepping mode</p>
46.	<p>8051 is :</p> <p>(1) 16-bit microprocessor (2) 8-bit microcontroller</p> <p>(3) 16-bit microcontroller (4) 8-bit microprocessor</p>
47.	<p>Microcontroller has :</p> <p>(1) Parallel I/O interface (2) Memory</p> <p>(3) (1) and (2) (4) None</p>
48.	<p>The Special Function registers of Microcontrollers exists in :</p> <p>(1) On chip ROM (2) On chip RAM</p> <p>(3) On chip EPROM (4) None</p>
49.	<p>The microprocessor can work as computer :</p> <p>(1) With external digital parts</p> <p>(2) Without external digital parts</p> <p>(3) With ROM and RAM only</p> <p>(4) None of the above</p>

Question No.	Questions
50.	<p>The CPU of 8051 contains :</p> <p>(1) Register A and B (2) Does not contain A and B</p> <p>(3) Contains A register only (4) Contains B register only</p>
51.	<p>$E \times H$ of microwave gives</p> <p>(1) Instantaneous power (2) Average power</p> <p>(3) Peak power (4) Reactive power</p>
52.	<p>In a dielectric medium</p> <p>(1) $\nabla \times H = J$ (2) $\nabla \times H = D$</p> <p>(3) $\nabla \times H = 0$ (4) $\nabla \times H = \rho_v$</p>
53.	<p>The velocity of electron in klystron is proportional to :</p> <p>(1) Square root of beam voltage</p> <p>(2) Electron charge</p> <p>(3) Electron mass</p> <p>(4) Square root of mass of the electron</p>
54.	<p>The output efficiency of reflex klystron is the ratio of :</p> <p>(1) Output RF power to input RF power</p> <p>(2) Output RF power to input DC power</p> <p>(3) Output DC power to input DC power</p> <p>(4) Output DC power to RF input power</p>

Question No.	Questions
55.	<p>An EM field is said to be non-existent or not Maxwellian if it fails to satisfy Maxwell's equations and the wave equations derived from them. Which of the following fields in free space are not Maxwellian?</p> <p>(1) $H = \cos x \cos 10^6 t a_x$ (2) $E = 100 \cos \omega t a_x$</p> <p>(3) $D = e^{-10y} \sin(10^5 t - 10y) a_z$ (4) $B = 0.4 \sin 10^4 t a_z$</p>
56.	<p>S-matrix exists for</p> <p>(1) Two ports only (2) Three ports only</p> <p>(3) Multiport network (4) Four ports</p>
57.	<p>A 500 m lossless transmission line is terminated by a load that is located at P on the Smith chart of Figure given below. If $\lambda = 150$ m, how many voltage maxima exist on the line?</p> <div data-bbox="662 1239 1016 1578" data-label="Figure"> </div> <p>(1) 7 (2) 6</p> <p>(3) 5 (4) 3</p>

Question No.	Questions
58.	<p>How many degenerate dominant modes exist in a rectangular resonant cavity for which $a = b = c$?</p> <div style="display: flex; justify-content: space-between;"> (1) 2 (2) 3 </div> <div style="display: flex; justify-content: space-between;"> (3) 5 (4) ∞ </div>
59.	<p>If a small single turn loop antenna has a radiation resistance of 0.04Ω, how many turns are needed to produce a radiation resistance of 1Ω ?</p> <div style="display: flex; justify-content: space-between;"> (1) 150 (2) 50 </div> <div style="display: flex; justify-content: space-between;"> (3) 25 (4) 5 </div>
60.	<p>Magic Tee can produce</p> <ol style="list-style-type: none"> (1) Sum and difference of signals (2) Oscillations (3) Only sum of signals (4) Only difference of signals
61.	<p>A half wave rectifier is equivalent to :</p> <ol style="list-style-type: none"> (1) Clamper circuit (2) Clipper circuit (3) Clamper circuit with negative bias (4) Clipper circuit with positive bias

Question No.	Questions
62.	<p>The operation of the BJT relies on _____</p> <p>(1) Free electrons (2) Holes</p> <p>(3) Both (1) and (2) (4) None of the above</p>
63.	<p>The advantages of FET are _____</p> <p>(1) It has better thermal stability</p> <p>(2) It predicts less noise</p> <p>(3) It can be used at high frequency</p> <p>(4) All of the above</p>
64.	<p>A device with direct current coupled, high gain electronic voltage type amplifier with one output and differential input is called _____.</p> <p>(1) Rectifier (2) Amplifier</p> <p>(3) Transformer (4) Op-amp</p>
65.	<p>An op-amp with negative feedback provides _____ output parameter.</p> <p>(1) Gain (2) Bandwidth</p> <p>(3) Input-output impedance (4) All the above</p>
66.	<p>What is the function of low pass filter in phase-locked loop ?</p> <p>(1) Improves low frequency noise</p> <p>(2) Removes high frequency noise</p> <p>(3) Tracks the voltage changes</p> <p>(4) Changes the input frequency</p>

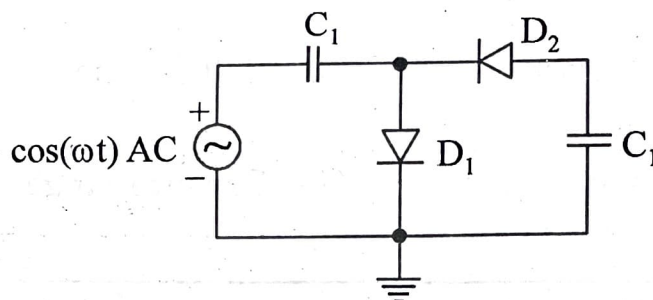
Question No.	Questions
67.	<p>Which characteristic of PLL is defined as the range of frequencies over which PLL can acquire lock with the input signal ?</p> <p>(1) Free-running state (2) Pull-in time</p> <p>(3) Lock-in range (4) Capture range</p>
68.	<p>A multivibrator that generates square wave of its own is called a :</p> <p>(1) Monostable multivibrator (2) Bistable multivibrator</p> <p>(3) Astable multivibrator (4) None of these</p>
69.	<p>Recommended frequency range of Harley oscillator is _____</p> <p>(1) 30 KHz–30 MHz (2) 1 KHz – 10 MHz</p> <p>(3) 2 Hz – 3 MHz (4) 0.5 KHz – 40 MHz</p>
70.	<p>The Hartley oscillator is less preferred than due to Colpitts oscillator's performance in</p> <p>(1) All frequency region (2) Mid frequency region</p> <p>(3) High frequency region (4) Low frequency region</p>

Question
No.

Questions

71.

The diodes and capacitors in the circuit shown are ideal. The voltage $v(t)$ across the diode D_1 is



(1) $\cos(\omega t)$

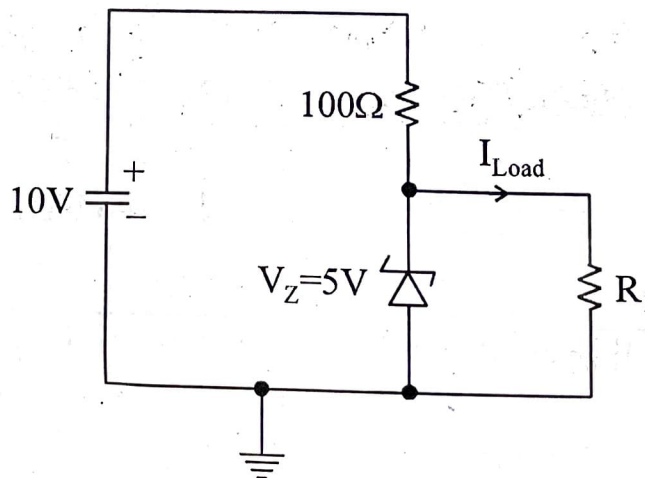
(2) $1 - \cos(\omega t)$

(3) $\sin(\omega t)$

(4) $1 - \sin(\omega t)$

72.

In the circuit shown below, the knee current of the ideal Zener diode is 10 mA. To maintain 5 V across R_L , the minimum value of R_L in Ω and the minimum power rating of the Zener diode in mW, respectively are :



(1) 125 and 125

(2) 125 and 250

(3) 250 and 125

(4) 250 and 250

Question No.	Questions
73.	<p>Consider a common-emitter current gain of 150 and a base current of $15\ \mu\text{A}$. If the transistor is biased in the forward active mode, the collector and emitter current will be :</p> <p>(1) 2.25 mA and 2.27 mA (2) 3.25 mA and 2.27 mA (3) 2.25 mA and 1.37 mA (4) 3.25 mA and 1.37 mA</p>
74.	<p>What is the drain current for a D-MOSFET having the characteristic values I_{DSS} of 10 mA, $V_{GS}(\text{off})$ of -4 V and I_{DSS} of $V_{GS} = +2\text{ V}$?</p> <p>(1) 22.5 mA (2) 17.5 mA (3) 12.5 mA (4) 2.5 mA</p>
75.	<p>Most of the linear ICs are based on the two-transistor differential amplifier because of its</p> <p>(1) input voltage dependent linear transfer characteristic (2) high voltage gain (3) high input resistance (4) high CMRR</p>
76.	<p>A dc power supply has no-load voltage of 30 V, and a full-load voltage of 25 V at full-load current of 1 A. Its output resistance and load regulation, respectively are</p> <p>(1) $5\ \Omega$ and 20% (2) $25\ \Omega$ and 20% (3) $5\ \Omega$ and 16.7% (4) $25\ \Omega$ and 16.7%</p>

Question No.	Questions				
77.	<p>NPN transistor is not suitable for good analog switch because</p> <ol style="list-style-type: none"> (1) IC – VCE characteristic curve pass directly through origin. (2) the device has very high input impedance (3) the device is asymmetrical with an offset voltage VCE off. (4) it has well defined transition frequency f_t. 				
78.	<p>CMOS logic has the property of</p> <ol style="list-style-type: none"> (1) increased capacitance and delay (2) decreased area (3) high noise margin (4) low static power dissipation 				
79.	<p>In a transistor switch, the voltage change from base-to-emitter which is adequate to accomplish the switching is only about</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">(1) 0.2 V</td><td style="width: 50%;">(2) 0.3 V</td></tr> <tr> <td>(3) 0.1 V</td><td>(4) 0.5 V</td></tr> </table>	(1) 0.2 V	(2) 0.3 V	(3) 0.1 V	(4) 0.5 V
(1) 0.2 V	(2) 0.3 V				
(3) 0.1 V	(4) 0.5 V				
80.	<p>Typical propagation delay of a CMOS gate ranges from</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">(1) 2 to 15 ns.</td><td style="width: 50%;">(2) 25 to 150 ns.</td></tr> <tr> <td>(3) 100 to 200 ns.</td><td>(4) 80 to 120 ns.</td></tr> </table>	(1) 2 to 15 ns.	(2) 25 to 150 ns.	(3) 100 to 200 ns.	(4) 80 to 120 ns.
(1) 2 to 15 ns.	(2) 25 to 150 ns.				
(3) 100 to 200 ns.	(4) 80 to 120 ns.				
81.	<p>SCR stand for</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">(1) Silicon Current Rectifier</td><td style="width: 50%;">(2) Silicon Convert Rectifier</td></tr> <tr> <td>(3) Silicon Controlled Rectifier</td><td>(4) None of these</td></tr> </table>	(1) Silicon Current Rectifier	(2) Silicon Convert Rectifier	(3) Silicon Controlled Rectifier	(4) None of these
(1) Silicon Current Rectifier	(2) Silicon Convert Rectifier				
(3) Silicon Controlled Rectifier	(4) None of these				

Question No.	Questions
82.	TRAIC is (1) Unidirectional thyristor (2) Bidirectional thyristor (3) Tri-directional thyristor (4) None of these
83.	Which statement is correct ? (1) SCR is three junction and four layers semiconductor device (2) SCR is two junction and four layers semiconductor device (3) SCR is three junction and two layers semiconductor device (4) SCR is four junction and three layers semiconductor device
84.	The dv/dt protection of SCR is achieved by using (1) RL circuit in series with SCR (2) RC circuit across SCR (3) L in series with SCR (4) RC circuit in series with SCR
85.	Which component is required to increase the switching speed in SMPA ? (1) MOSFET (2) SCR (3) Transistor (4) All of these
86.	If all the poles of the system lie in the left half of s-plane then system is (1) Unstable (2) Marginally stable (3) Stable (4) None of these

Question No.	Questions
87.	<p>The step size of stepper motor with 10 rotor tooth is</p> <p>(1) 36° (2) 45° (3) 25° (4) 26°</p>
88.	<p>Transfer function is defined as</p> <p>(1) Linear and time variant system (2) Linear and invariant system (3) Non-linear and time variant system (4) Non-linear and time invariant system</p>
89.	<p>The main drawback of feedback system</p> <p>(1) Inaccuracy (2) Inefficiency (3) Insensitivity (4) Instability</p>
90.	<p>Which of the following statement is correct ?</p> <p>(1) Proportional-Derivative (PD) controller is equivalent to high pass filter (2) For better performance, integral action is initiated before derivative action (3) A practical PID controller uses a high gain amplifier in the forward path (4) High proportional gain is an alternative to derivative actions</p>
91.	<p>The Hilbert transform of $\cos \omega_1 t + \sin \omega_1 t$</p> <p>(1) $\cos \omega_1 t + \sin \omega_1 t$ (2) $\cos \omega_1 t - \sin \omega_1 t$ (3) $\sin \omega_1 t + \sin \omega_2 t$ (4) $\sin \omega_1 t - \sin \omega_2 t$</p>

Question No.	Questions
92.	<p>The Fourier transform of a signal $H(j\omega) = (2 \cos \omega) (\sin 2\omega)/\omega$</p> <p>(1) $1/4$ (2) $1/2$ (3) 1 (4) 2</p>
93.	<p>Let $y[n]$ denote the convolution of $h[n]$ and $g[n]$, where $h(n) = (1/2)^n u(n)$, $g(n)$ is a causal sequence. If $y[0] = 1$ and $y[1] = 1/2$, then $g[1]$ equals</p> <p>(1) 0 (2) $1/2$ (3) 1 (4) $3/2$</p>
94.	<p>The trigonometric Fourier series of an even function does not have the</p> <p>(1) dc term (2) cosine terms (3) sine terms (4) odd harmonic terms</p>
95.	<p>A system is defined by its impulse response $h(n) = 2^n u(n-2)$. The system is</p> <p>(1) stable and causal (2) causal but not stable (3) stable but not causal (4) unstable and non-causal</p>
96.	<p>The first six points of the 8-point DFT of a real valued sequence are $5, 1 - j3, 0, 3 - 4j, 0$ and $3 + 4j$. The last two points of the DFT are respectively</p> <p>(1) $0, 1 - j$ (2) $0, 1 + j$ (3) $1 + 3j, 5$ (4) $1 - 3j, 5$</p>

Question No.	Questions
97.	<p>The Fourier series of a real periodic function has only</p> <p>(1) cosine terms if it is even</p> <p>(2) sine terms if it is even</p> <p>(3) cosine terms if it is odd</p> <p>(4) sine terms if it is odd</p>
98.	<p>The ROC of z-transform of the discrete time sequence</p> $X(n) = (1/3)^n - (1/2)^n u(-n-1)$ <p>(1) $1/3 < z < 1/2$ (2) $z > 1/2$</p> <p>(3) $z > 1/2$ (4) $3 < z < 2$</p>
99.	<p>The 4-point Discrete Fourier Transform (DFT) of a discrete time sequence {1, 0, 2, 3} is</p> <p>(1) $[0, -2 + 2j, 2, -2 - 2j]$ (2) $[2, 2 + 2j, 6, 2 - 2j]$</p> <p>(3) $[6, 1 - 3j, 2, 1 + 3j]$ (4) $[6, -1 + 3j, 0, -1 - 3j]$</p>
100.	<p>The input and output of a continuous time system are respectively denoted by $x(t)$ and $y(t)$. Which of the following descriptions corresponds to a causal system</p> <p>(1) $y(t) = x(t-2) + x(t+2)$</p> <p>(2) $y(t) = (t+5)x(t+5)$</p> <p>(3) $y(t) = (t-4)(t+1)$</p> <p>(4) $y(t) = (t+5)x(t+5)$</p>

SET-“Z”

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(Ph.D/URS-EE Jan. 2022)

Code



ELECTRONICS & COMMUNICATION
ENGINEERING

Sr. No. 10012

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Father's Name : _____

Mother's Name : _____ Date of Examination : _____

(Signature of the candidate)

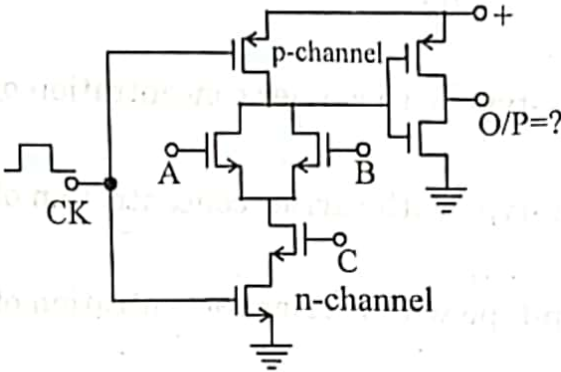
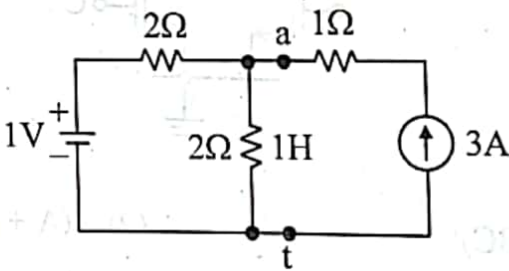
(Signature of the Invigilator)

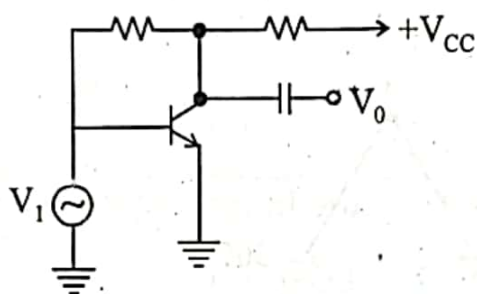
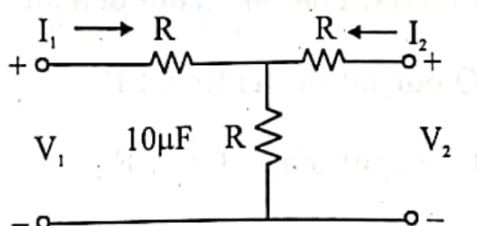
CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

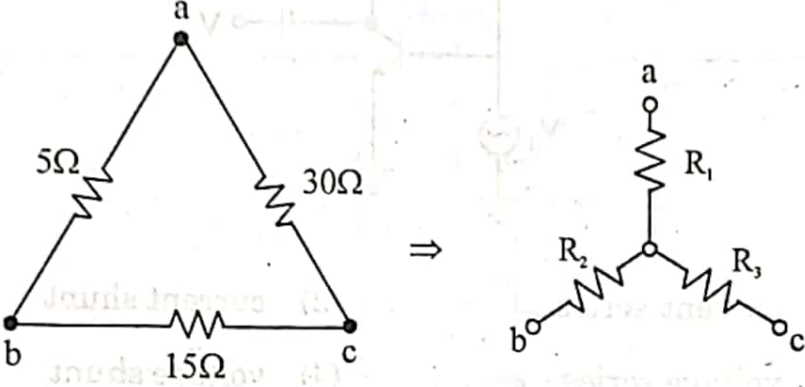
1. All questions are compulsory.
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A,B,C and D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E-Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer, in OMR Answer-Sheet will be treated as incorrect answer.
7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	<p>A silicon sample is uniformly doped with 1.0×10^6 phosphorous atoms/cm³ and 2×10^6 boron atoms/cm³. If all the dopants are fully ionized, the material is</p> <p>(1) n-type with carrier concentration of 10^6 cm</p> <p>(2) p-type with carrier concentration of 10^6 cm</p> <p>(3) p-type with carrier concentration of 2×10^{16} cm</p> <p>(4) T2 will get damaged and T1 will be safe</p>
2.	<p>The CMOS equivalent of the following n MOS gate (in figure) is _____ (draw the circuit)</p> <div data-bbox="555 1167 917 1601" data-label="Diagram"> </div> <p>(1) $(A + BC)'$</p> <p>(2) $(A + B)(B + C)$</p> <p>(3) $AB + BC$</p> <p>(4) $AC + AB$</p>

Question No.	Questions
3.	<p>In figure, the Boolean expression for the output in terms of inputs A, B and C when the clock 'CK' is high, is given by _____</p>  <p>(1) $(A + B) C$ (2) $A.B.C$ (3) AC (4) AB</p>
4.	<p>The unit impulse response of a linear time invariant system is the unit step function $u(t)$. For $t > 0$, the response of the system of an excitation $e^{-at} u(t)$, $a > 0$</p> <p>(1) $a e^{-at}$ (2) $a (1 - e^{-at})$ (3) $(1 - e^{-at})$ (4) $1/a (1 - e^{-at})$</p>
5.	<p>The voltage across the terminals a and b in Fig.</p>  <p>(1) 0.5 V (2) 3 V (3) 3.5 V (4) 4 V</p>

Question No.	Questions
6.	<p>The circuit of Fig. is an example of feedback of the following type</p>  <p>(1) current series (2) current shunt (3) voltage series (4) voltage shunt</p>
7.	<p>The intrinsic impedance of copper at high frequencies is</p> <p>(1) purely resistive (2) purely inductive (3) complex with a capacitive component (4) complex with an inductive component</p>
8.	<p>A 2-port network is shown in Fig. the parameter h_{21} for this network can be given by</p>  <p>(1) $-1/2$ (2) $1/2$ (3) $(-3/2)$ (4) $3/2$</p>

Question No.	Questions
9.	<p>A Delta-connected network with its Wye-equivalent is shown in Fig. The resistance R_1, R_2 and R_3 (in ohms) are respectively</p>  <p>(1) 1.5, 3 and 9 (2) 3, 9 and 1.5 (3) 9, 3 and 1.5 (4) 3, 1.5 and 9</p>
10.	<p>The Fourier Transform of the signal $x(t) = \delta(t)$ is of the following form,</p> <p>(1) 1 (2) 0 (3) s (4) 1/s</p>
11.	<p>How can parallel data be taken out of a shift register simultaneously ?</p> <p>(1) Use the Q output of the first FF (2) Use the Q output of the last FF (3) Tie all of the Q outputs together (4) Use the Q output of each FF</p>

Question No.	Questions
12.	<p>A logic circuit that accepts several data inputs and allows only one of them at a time to get through to the output is called</p> <p>(1) Multiplexer (2) De-multiplexer</p> <p>(3) Transmitter (4) Receiver</p>
13.	<p>The logical sum of two or more logical product terms is called :</p> <p>(1) SOP (2) POS</p> <p>(3) OR operation (4) NAND operation</p>
14.	<p>A finite state machine :</p> <p>(1) is same as that of abstract model of sequential circuit</p> <p>(2) consists of combinational logic circuits only</p> <p>(3) contains infinite number of memory devices</p> <p>(4) does not exist in practice</p>
15.	<p>The memory technology which needs the least power is</p> <p>(1) ECL (2) MOS</p> <p>(3) CMOS (4) TTL</p>
16.	<p>K-map is used to minimize the number of :</p> <p>(1) Flip-flops in digital circuits</p> <p>(2) Layout spaces in digital circuits for fabrication</p> <p>(3) Functions of 3, 4, 5 or 6 variables</p> <p>(4) Registers in CPU</p>

Question No.	Questions
22.	8086 microprocessor is designed to operate in how many modes ? (1) Two (2) Four (3) Eight (4) Sixteen
23.	Data pins of 16 bit ALU of 8086 is : (1) AD_{16} to AD_1 (2) AD_{15} to AD_0 (3) AD_{15} to AD_1 (4) AD_{16} to AD_0
24.	Pointer register of 8086 is : (1) Base pointer (2) Index pointer (3) Segment pointer (4) Stack segment pointer
25.	For TRAP FLAG (TF = 0) in 8086 : (1) Microprocessor will not execute the complete program in a single operation (2) Microprocessor will execute the program in single stepping mode (3) Microprocessor will execute the complete program in a single operation (4) Microprocessor will not execute the program in single stepping mode
26.	8051 is : (1) 16-bit microprocessor (2) 8-bit microcontroller (3) 16-bit microcontroller (4) 8-bit microprocessor

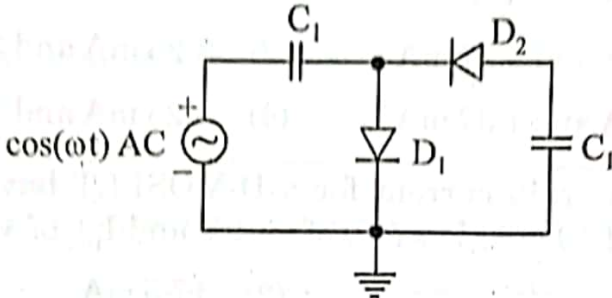
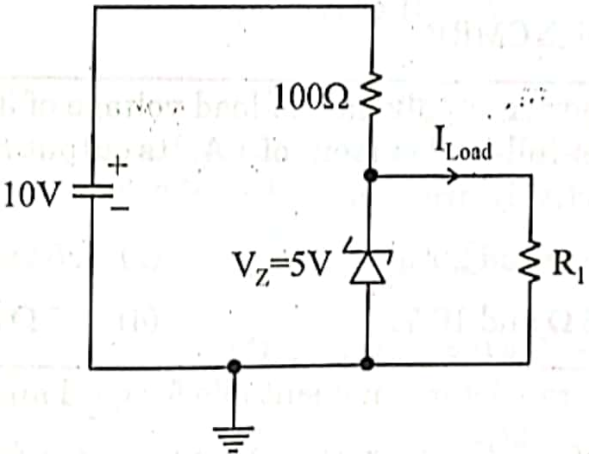
Question No.	Questions
27.	Microcontroller has : (1) Parallel I/O interface (2) Memory (3) (1) and (2) (4) None
28.	The Special Function registers of Microcontrollers exists in : (1) On chip ROM (2) On chip RAM (3) On chip EPROM (4) None
29.	The microprocessor can work as computer : (1) With external digital parts (2) Without external digital parts (3) With ROM and RAM only (4) None of the above
30.	The CPU of 8051 contains : (1) Register A and B (2) Does not contain A and B (3) Contains A register only (4) Contains B register only
31.	A zero to 300 V voltmeter has a guaranteed accuracy of 1% full scale reading. The voltage measured by the instruments is 83 V. The percent limiting error is (1) 0.67 (2) 2.63 (3) 3.62 (4) 1.67

Question No.	Questions
32.	<p>Frequency can be measured by using</p> <p>(1) Maxwell's bridge (2) Wein's bridge</p> <p>(3) Schering bridge (4) None of these</p>
33.	<p>A linear displacement transducer (such as digital) is generally uses</p> <p>(1) Gray Code (2) Binary code</p> <p>(3) Excess 3 code (4) Octal code</p>
34.	<p>Hall effect transducer is applicable for such type of measurement like</p> <p>(1) Power (2) Displacement</p> <p>(3) Current (4) All of these</p>
35.	<p>Which type of detector is used in ac bridges for audio frequency range ?</p> <p>(1) AC voltmeter (2) CRO</p> <p>(3) Headphone (4) Vibration galvanometer</p>
36.	<p>Which of the following optical transducers used is an active transducer ?</p> <p>(1) Photo voltaic cell (2) Photo emission cell</p> <p>(3) Photo diode (4) Photo transistor</p>

Question No.	Questions
37.	<p>A compensated wattmeter has its reading corrected for the error due to</p> <ul style="list-style-type: none"> (1) Friction (2) Frequency (3) Power consumed due to load (4) Power consumed in potential coil
38.	<p>A dual beam CRO has</p> <ul style="list-style-type: none"> (1) Two horizontal amplifiers (2) Two trigger circuits (3) Two vertical amplifiers (4) All the above
39.	<p>A template matching is performed on an EEG signal with spike and wave by matched filter. Which of the following statements are true ?</p> <ul style="list-style-type: none"> (1) Peaks in the filter response represent the presence of alpha wave (2) Peaks in the filter response represent the presence of spike and wave complexes (3) Matched filter does not cause a lag in the output (4) None of these
40.	<p>Internet of Things IoT is a network of</p> <ul style="list-style-type: none"> (1) Sensors (2) Controllers (3) Actuators (4) All the above

Question No.	Questions
41.	<p>In digital transmission, the modulation technique that requires minimum bandwidth is</p> <p>(1) Delta modulation (2) PCM</p> <p>(3) DPCM (4) PAM</p>
42.	<p>In Differential Pulse Code Modulation techniques, the decoding is performed by</p> <p>(1) PLL (2) Accumulator</p> <p>(3) Sampler (4) Quantizer</p>
43.	<p>The noise that affects PCM</p> <p>(1) Transmission noise</p> <p>(2) Quantizing noise</p> <p>(3) Transit noise</p> <p>(4) Both (1) and (2) are correct</p>
44.	<p>Matched filter may be optimally used only for</p> <p>(1) Flicker (2) Transit time noise</p> <p>(3) Gaussian noise (4) All of the above</p>
45.	<p>Regenerative repeaters are used for</p> <p>(1) Eliminating noise</p> <p>(2) Reconstruction of signals</p> <p>(3) Transmission over long distances</p> <p>(4) All of the above</p>

Question No.	Questions
46.	<p>The technique that may be used to increase average information per bit is</p> <p>(1) FSK</p> <p>(2) ASK</p> <p>(3) Shannon-Fano algorithm</p> <p>(4) Digital modulation techniques</p>
47.	<p>ISI may be removed by using</p> <p>(1) Differential coding (2) Manchester coding</p> <p>(3) Polar NRZ (4) None of the above</p>
48.	<p>The code in convolution coding is generated using</p> <p>(1) EX-OR logic</p> <p>(2) AND logic</p> <p>(3) OR logic</p> <p>(4) None of the above</p>
49.	<p>Parity check bit coding is used for</p> <p>(1) Error correction</p> <p>(2) Error detection</p> <p>(3) Error correction and detection</p> <p>(4) None of the above</p>
50.	<p>In MSK, the difference between the higher and lower frequency is</p> <p>(1) Same as the bit rate</p> <p>(2) Half of the bit rate</p> <p>(3) Twice of the bit rate</p> <p>(4) Four time the bit rate</p>

Question No.	Questions
51.	<p>The diodes and capacitors in the circuit shown are ideal. The voltage $v(t)$ across the diode D_1 is</p>  <p>(1) $\cos(\omega t)$ (2) $1 - \cos(\omega t)$ (3) $\sin(\omega t)$ (4) $1 - \sin(\omega t)$</p>
52.	<p>In the circuit shown below, the knee current of the ideal Zener diode is 10 mA. To maintain 5 V across R_L, the minimum value of R_L in Ω and the minimum power rating of the Zener diode in mW, respectively are :</p>  <p>(1) 125 and 125 (2) 125 and 250 (3) 250 and 125 (4) 250 and 250</p>

Question No.	Questions
53.	<p>Consider a common-emitter current gain of 150 and a base current of $15 \mu\text{A}$. If the transistor is biased in the forward active mode, the collector and emitter current will be :</p> <p>(1) 2.25 mA and 2.27 mA (2) 3.25 mA and 2.27 mA (3) 2.25 mA and 1.37 mA (4) 3.25 mA and 1.37 mA</p>
54.	<p>What is the drain current for a D-MOSFET having the characteristic values I_{DSS} of 10 mA, $V_{GS}(\text{off})$ of -4 V and I_{DSS} of $V_{GS} = +2 \text{ V}$?</p> <p>(1) 22.5 mA (2) 17.5 mA (3) 12.5 mA (4) 2.5 mA</p>
55.	<p>Most of the linear ICs are based on the two-transistor differential amplifier because of its</p> <p>(1) input voltage dependent linear transfer characteristic (2) high voltage gain (3) high input resistance (4) high CMRR</p>
56.	<p>A dc power supply has no-load voltage of 30 V, and a full-load voltage of 25 V at full-load current of 1 A. Its output resistance and load regulation, respectively are</p> <p>(1) 5Ω and 20% (2) 25Ω and 20% (3) 5Ω and 16.7% (4) 25Ω and 16.7%</p>
57.	<p>NPN transistor is not suitable for good analog switch because</p> <p>(1) IC – VCE characteristic curve pass directly through origin. (2) the device has very high input impedance (3) the device is asymmetrical with an offset voltage VCE off. (4) it has well defined transition frequency f_t.</p>

Question No.	Questions
58.	CMOS logic has the property of (1) increased capacitance and delay (2) decreased area (3) high noise margin (4) low static power dissipation
59.	In a transistor switch, the voltage change from base-to-emitter which is adequate to accomplish the switching is only about (1) 0.2 V (2) 0.3 V (3) 0.1 V (4) 0.5 V
60.	Typical propagation delay of a CMOS gate ranges from (1) 2 to 15 ns. (2) 25 to 150 ns. (3) 100 to 200 ns. (4) 80 to 120 ns.
61.	The Hilbert transform of $\cos \omega_1 t + \sin \omega_1 t$ (1) $\cos \omega_1 t + \sin \omega_1 t$ (2) $\cos \omega_1 t - \sin \omega_1 t$ (3) $\sin \omega_1 t + \sin \omega_2 t$ (4) $\sin \omega_1 t - \sin \omega_2 t$
62.	The Fourier transform of a signal $H(j\omega) = (2 \cos \omega) (\sin 2\omega)/\omega$ (1) 1/4 (2) 1/2 (3) 1 (4) 2

Question No.	Questions
67.	<p>The Fourier series of a real periodic function has only</p> <p>(1) cosine terms if it is even</p> <p>(2) sine terms if it is even</p> <p>(3) cosine terms if it is odd</p> <p>(4) sine terms if it is odd</p>
68.	<p>The ROC of z-transform of the discrete time sequence</p> $X(n) = (1/3)^n - (1/2)^n u(-n-1)$ <p>(1) $1/3 < z < 1/2$ (2) $z > 1/2$</p> <p>(3) $z > 1/2$ (4) $3 < z < 2$</p>
69.	<p>The 4-point Discrete Fourier Transform (DFT) of a discrete time sequence {1, 0, 2, 3} is</p> <p>(1) $[0, -2 + 2j, 2, -2 - 2j]$ (2) $[2, 2 + 2j, 6, 2 - 2j]$</p> <p>(3) $[6, 1 - 3j, 2, 1 + 3j]$ (4) $[6, -1 + 3j, 0, -1 - 3j]$</p>
70.	<p>The input and output of a continuous time system are respectively denoted by $x(t)$ and $y(t)$. Which of the following descriptions corresponds to a causal system</p> <p>(1) $y(t) = x(t-2) + x(t+2)$</p> <p>(2) $y(t) = (t+5)x(t+5)$</p> <p>(3) $y(t) = (t-4)(t+1)$</p> <p>(4) $y(t) = (t+5)x(t+5)$</p>

Question No.	Questions
71.	SCR stand for (1) Silicon Current Rectifier (2) Silicon Convert Rectifier (3) Silicon Controlled Rectifier (4) None of these
72.	TRAIC is (1) Unidirectional thyristor (2) Bidirectional thyristor (3) Tri-directional thyristor (4) None of these
73.	Which statement is correct ? (1) SCR is three junction and four layers semiconductor device (2) SCR is two junction and four layers semiconductor device (3) SCR is three junction and two layers semiconductor device (4) SCR is four junction and three layers semiconductor device
74.	The dv/dt protection of SCR is achieved by using (1) RL circuit in series with SCR (2) RC circuit across SCR (3) L in series with SCR (4) RC circuit in series with SCR
75.	Which component is required to increase the switching speed in SMPA ? (1) MOSFET (2) SCR (3) Transistor (4) All of these

Question No.	Questions
76.	<p>If all the poles of the system lie in the left half of s-plane then system is</p> <p>(1) Unstable (2) Marginally stable</p> <p>(3) Stable (4) None of these</p>
77.	<p>The step size of stepper motor with 10 rotor tooth is</p> <p>(1) 36° (2) 45°</p> <p>(3) 25° (4) 26°</p>
78.	<p>Transfer function is defined as</p> <p>(1) Linear and time variant system</p> <p>(2) Linear and invariant system</p> <p>(3) Non-linear and time variant system</p> <p>(4) Non-linear and time invariant system</p>
79.	<p>The main drawback of feedback system</p> <p>(1) Inaccuracy (2) Inefficiency</p> <p>(3) Insensitivity (4) Instability</p>
80.	<p>Which of the following statement is correct ?</p> <p>(1) Proportional-Derivative (PD) controller is equivalent to high pass filter</p> <p>(2) For better performance, integral action is initiated before derivative action</p> <p>(3) A practical PID controller uses a high gain amplifier in the forward path</p> <p>(4) High proportional gain is an alternative to derivative actions</p>

Question No.	Questions
81.	<p>$E \times H$ of microwave gives</p> <p>(1) Instantaneous power (2) Average power</p> <p>(3) Peak power (4) Reactive power</p>
82.	<p>In a dielectric medium</p> <p>(1) $\nabla \times H = J$ (2) $\nabla \times H = D$</p> <p>(3) $\nabla \times H = 0$ (4) $\nabla \times H = \rho_v$</p>
83.	<p>The velocity of electron in klystron is proportional to :</p> <p>(1) Square root of beam voltage</p> <p>(2) Electron charge</p> <p>(3) Electron mass</p> <p>(4) Square root of mass of the electron</p>
84.	<p>The output efficiency of reflex klystron is the ratio of :</p> <p>(1) Output RF power to input RF power</p> <p>(2) Output RF power to input DC power</p> <p>(3) Output DC power to input DC power</p> <p>(4) Output DC power to RF input power</p>

Question No.	Questions
85.	<p>An EM field is said to be non-existent or not Maxwellian if it fails to satisfy Maxwell's equations and the wave equations derived from them. Which of the following fields in free space are not Maxwellian?</p> <p>(1) $H = \cos x \cos 10^6 t \mathbf{a}_x$ (2) $E = 100 \cos wt \mathbf{a}_x$</p> <p>(3) $D = e^{-10y} \sin(10^5 t - 10y) \mathbf{a}_z$ (4) $B = 0.4 \sin 10^4 t \mathbf{a}_z$</p>
86.	<p>S-matrix exists for</p> <p>(1) Two ports only (2) Three ports only</p> <p>(3) Multiport network (4) Four ports</p>
87.	<p>A 500 m lossless transmission line is terminated by a load that is located at P on the Smith chart of Figure given below. If $\lambda = 150$ m, how many voltage maxima exist on the line?</p> <div data-bbox="558 1272 949 1630" data-label="Figure"> </div> <p>(1) 7 (2) 6</p> <p>(3) 5 (4) 3</p>

Question No.	Questions
92.	<p>The operation of the BJT relies on _____</p> <p>(1) Free electrons (2) Holes</p> <p>(3) Both (1) and (2) (4) None of the above</p>
93.	<p>The advantages of FET are _____</p> <p>(1) It has better thermal stability</p> <p>(2) It predicts less noise</p> <p>(3) It can be used at high frequency</p> <p>(4) All of the above</p>
94.	<p>A device with direct current coupled, high gain electronic voltage type amplifier with one output and differential input is called _____.</p> <p>(1) Rectifier (2) Amplifier</p> <p>(3) Transformer (4) Op-amp</p>
95.	<p>An op-amp with negative feedback provides _____ output parameter.</p> <p>(1) Gain (2) Bandwidth</p> <p>(3) Input-output impedance (4) All the above</p>
96.	<p>What is the function of low pass filter in phase-locked loop ?</p> <p>(1) Improves low frequency noise</p> <p>(2) Removes high frequency noise</p> <p>(3) Tracks the voltage changes</p> <p>(4) Changes the input frequency</p>

Question No.	Questions
97.	<p>Which characteristic of PLL is defined as the range of frequencies over which PLL can acquire lock with the input signal ?</p> <p>(1) Free-running state (2) Pull-in time</p> <p>(3) Lock-in range (4) Capture range</p>
98.	<p>A multivibrator that generates square wave of its own is called a :</p> <p>(1) Monostable multivibrator (2) Bistable multivibrator</p> <p>(3) Astable multivibrator (4) None of these</p>
99.	<p>Recommended frequency range of Harley oscillator is _____</p> <p>(1) 30 KHz–30 MHz (2) 1 KHz – 10 MHz</p> <p>(3) 2 Hz – 3 MHz (4) 0.5 KHz – 40 MHz</p>
100.	<p>The Hartley oscillator is less preferred than due to Colpitts oscillator's performance in</p> <p>(1) All frequency region (2) Mid frequency region</p> <p>(3) High frequency region (4) Low frequency region</p>

Electronics & Communication Engg.

	A	B	C	D
1	3	2	3	2
2	2	3	2	1
3	1	4	1	1
4	2	4	4	2
5	4	4	3	3
6	3	2	1	4
7	1	4	4	4
8	2	3	3	1
9	4	1	2	4
10	4	3	4	2
11	3	1	1	4
12	2	2	2	1
13	1	1	4	1
14	4	2	3	1
15	3	2	4	3
16	1	3	3	3
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24	2	2	2	1
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33	2	4	1	1
34	1	3	1	4
35	3	4	3	3
36	2	3	3	1
37	3	1	1	4
38	2	1	3	3
39	1	2	4	2
40	1	2	2	4
41	2	1	4	1
42	3	1	1	2
43	4	1	2	4
44	4	3	1	3
45	4	4	3	4
46	2	2	2	3




47	4	3	3	1
48	3	4	2	1
49	1	4	1	2
50	3	2	1	2
51	4	4	1	1
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64	3	2	4	3
65	4	3	4	2
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68	4	1	3	3
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73	1	1	1	1
74	2	3	3	2
75	3	2	4	4
76	4	2	2	3
77	4	1	3	1
78	1	3	4	2
79	4	4	4	4
80	2	3	2	4
81	1	3	3	1
82	3	2	2	2
83	1	1	1	1
84	3	4	2	2
85	2	3	4	2
86	2	1	3	3
87	1	4	1	3
88	3	3	2	2
89	4	2	4	4
90	3	4	4	1
91	1	4	1	2
92	2	1	3	3
93	4	1	1	4

[Handwritten signatures]

94	3	1	3	4
95	4	3	2	4
96	3	3	2	2
97	1	1	1	4
98	1	3	3	3
99	2	4	4	1
100	2	2	3	3

