

# OCET 2011

Sr. No. :

## Question Booklet Series : A

**Important :** Please consult your Admit Card / Roll No. Slip before filling your Roll Number on the Test Booklet and Answer Sheet.

**Roll No.**

*In Figures*

*In Words*

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**O.M.R. Answer Sheet Serial No.**

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Signature of the Candidate : \_\_\_\_\_

**Subject : M.E. (Electronics & Communication Engineering)**

**Time : 90 minutes**

**Number of Questions : 75**

**Maximum Marks : 75**

**DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO**

### INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and series code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen.**
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the paper seal (s) gently when asked to do so.
5. Please check that this Question Booklet contains **75** questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point / Black Gel pen.**
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation**. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/ noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent / Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculators is not allowed.**

**M. E. (Electronics & Communication Engineering)/A**

1. **The diode which permits remote tuning, is :**  
(A) Power diode (B) Varactor  
(C) Zener diode (D) PIN diode
2. **The regulation of an excellent rectifier should be :**  
(A) infinite (B) finite  
(C) zero (D) negative
3. **CB transistor has input and output resistances respectively :**  
(A) low, high (B) high, low  
(C) high, high (D) low, low
4. **In a MOSFET, the threshold voltage can be lowered by :**  
(A) increasing the gateoxide thickness (B) reducing the substrate concentration  
(C) increasing the substrate concentration (D) using the dielectric of lower constant
5. **The best Q-point in an amplifier for faithful reproduction of the signal is selected :**  
(A) near cut-off (B) near saturation  
(C) in the middle of the active region (D) anywhere
6. **The rise time  $t_r$  for a square wave input of an amplifier is related to its 3 dB frequency in case of square wave input as :**  
(A)  $t_r = 0.35/f_2$  (B)  $t_r = 0.90/f_2$   
(C)  $t_r = \sqrt{0.35/f_2}$  (D)  $t_r = 1/\sqrt{f_2}$
7. **The upper 3 dB frequency of a single stage amplifier is 1 MHz, how many identical stages result in approximately 510 KHz upper 3 dB frequency ?**  
(A) 2 (B) 3  
(C) 4 (D) 6
8. **The gain bandwidth product of an FET amplifier w.r.t. a BJT amplifier is :**  
(A) low (B) high  
(C) equal (D) zero
9. **If the value of  $C_\mu = 2$  pF,  $C_\pi = 100$  pF,  $g_m = 100$  mS,  $R_L = 1$  K $\Omega$ , the value of Miller capacitance  $C_M$  is :**  
(A) 302 pF (B) 0.49 pF  
(C) 2.02 pF (D) 202 pF
10. **Common drain amplifier is an example of :**  
(A) current series feedback (B) current shunt feedback  
(C) voltage series feedback (D) voltage shunt feedback

- 11. The Weinbridge oscillator uses :**
- (A) negative feedback only (B) positive feedback only  
 (C) negative and positive feedback both (D) no feedback at all
- 12. The shunt type regulator is suitable for :**
- (A) low current and high voltage (B) low current and low voltage  
 (C) high current and high voltage (D) high current and low voltage
- 13. A practical power amplifier has cascaded stages of :**
- (A) voltage amplifiers, a driver stage and a power stage  
 (B) current amplifiers, a driver stage and a power stage  
 (C) a driver stage, a power stage and voltage amplifiers  
 (D) a driver stage, voltage amplifiers and a power stage
- 14. Two's complement of a certain binary number is 11100101. The binary number is :**
- (A) 00011010 (B) 00011011  
 (C) 11100110 (D) Indeterminate from given data
- 15.  $(1111)_2 \times (3)_8$  equals :**
- (A)  $(45)_{10}$  (B)  $(100111)_2$   
 (C)  $(45)_8$  (D) All of above
- 16. One of the inputs of a two-input logic gate is permanently tied to logic '0' state. This converts it into a NOT circuit. The logic gate possibly is either :**
- (A) EX-NOR or NOR (B) EX-NOR or OR  
 (C) EX-OR or NAND (D) NOR or NAND
- 17. The unused inputs of CMOS logic family devices should never be left open. They should :**
- (A) preferably be grounded  
 (B) preferably be tied to  $+V_{DD}$   
 (C) be tied to either logic LOW or logic HIGH level or another used input  
 (D) preferably be connected to one of the used inputs
- 18. In digital electronics, the equality  $(A+B+C) = A' + B' + C'$  is better known as :**
- (A) Involution law (B) Absorption law  
 (C) Complementation law (D) DeMorgan's law
- 19. In the case of addition of two bits, the sum bit can be implemented by :**
- (A) 2-input EX-OR gate (B) 2-input NAND gate  
 (C) 2-input EX-NOR gate (D) 2-input NOR gate

- 20. A data selector is also called as :**
- (A) De-multiplexer (B) Priority encoder  
(C) Multiplexer (D) Decoder
- 21. The basic sequential logic building block in which the output follows the data input as long as the ENABLE input is active is ?**
- (A) J-K flip-flop (B) D flip-flop  
(C) T flip-flop (D) D latch
- 22. Mark the false statement :**
- (A) Ring counter is a synchronous counter  
(B) The output of a ring counter is always a square wave  
(C) Johnson counter is a synchronous counter  
(D) The decoding circuitry for a Johnson counter is simpler than that of a binary counter
- 23. Out of the following, the fastest A/D converter type is :**
- (A) Counter type (B) Successive approximation type  
(C) Flash or simultaneous type (D) Dual-slope integrating type
- 24. Substrate in a monolithic IC has thickness of the order of :**
- (A) 1 mils (B) 5 mils  
(C) 25 mils (D) 50 mils
- 25. An inductor at time  $t = 0 +$ , with zero initial current acts as a :**
- (A) Open circuit (B) Short circuit  
(C) Constant current source (D) Constant voltage source
- 26. A dc voltage  $V = 10$  volts is applied to a series circuit consisting of a resistor  $R = 2$  ohm and a capacitor  $C = 10$  pF. The voltage across capacitor after one time constant is :**
- (A) zero (B) 1.85 volts  
(C) 3.7 volts (D) 6.3 volts
- 27. A series RLC circuit resonates at 1000 KHz. At frequency of 1005 KHz, the circuit impedance is :**
- (A) Resistive (B) Capacitive  
(C) Inductive (D) Minimum
- 28. In a constant-k band stop filter, the shunt arm consists of :**
- (A) Capacitor only (B) Inductor only  
(C) Capacitor and inductor in series (D) Capacitor and inductor in parallel

- 29. The reflection coefficient for a transmission line is 0.2. The VSWR is :**
- (A) 1.5 (B) 0.66  
(C) 0.04 (D) Zero
- 30. If a dielectric is placed in an electric field, the field strength :**
- (A) Increases (B) Decreases  
(C) Remains unaltered (D) Becomes zero
- 31. Waves which do not exist in a waveguide is :**
- (A) TM waves (B) TE waves  
(C) TEM waves (D) TE and TM waves
- 32. Frequencies in the UHF range propagate by means of :**
- (A) Space wave (B) Ionospheric scatter  
(C) Surface wave (D) Sky wave
- 33. Which of the following meters can not measure both dc as well as ac ?**
- (A) Moving iron meter (B) Thermocouple meter  
(C) Dynamometer (D) Induction type meter
- 34. Transducer is a device which :**
- (A) converts one form of power into another (B) converts one form of energy into another  
(C) helps in measuring electrical signals (D) is similar to a transformer
- 35. Dummy strain gauge is used to :**
- (A) increase the efficiency (B) increase the range  
(C) compensate for temperature changes (D) make the bridge self balancing
- 36. Presence of emitter bypass capacitor in CE amplifier adversely affects the :**
- (A) low frequency response (B) midband response  
(C) high frequency response (D) response over the complete frequency range
- 37. The capacity of a channel is :**
- (A) Number of digits used in coding (B) Volume of information it can take  
(C) Maximum rate of information transmission (D) Bandwidth required for information
- 38. Entropy of two equiprobable messages is :**
- (A) Zero (B) 0.5  
(C) 2.0 (D) One
- 39. An ergodic process in communication is present if many random signals have :**
- (A) Identical time average  
(B) Identical ensemble average  
(C) Either identical time or identical ensemble average  
(D) Identical time and identical ensemble averages

- 40. In FM broadcast, the maximum modulation frequency is restricted to :**
- (A) 20 KHz (B) 15 KHz  
(C) 10 KHz (D) 5 KHz
- 41. In amplitude modulation, the modulation envelope has a peak value double the unmodulated carrier value. The modulation index is :**
- (A) 1.0 (B) 0.75  
(C) 0.5 (D) 0.25
- 42. Pre-emphasis in communication system is used to boost up :**
- (A) Low modulation frequencies (B) High modulation frequencies  
(C) Both low and high modulation frequencies (D) Overall modulation index
- 43. Which of the following events will not happen when quantizing noise is decreased in PCM ?**
- (A) Increase in the number of standard levels (B) Increase in bandwidth  
(C) Decrease in channel noise (D) Decrease in randomness
- 44. In order to separate out channels in an FDM receiver, it is necessary to use :**
- (A) AND gates (B) Band pass filters  
(C) Band stop filters (D) Integrators
- 45. To prevent loading of the IF amplifier in a receiver, we should use :**
- (A) Variable sensitivity (B) Variable selectivity  
(C) Double frequency conversion (D) Squelch circuit
- 46. Which of the following will increase the antenna radiation resistance ?**
- (A) Use of larger section of conductor (B) Top loading of antenna  
(C) Providing insulation on the conductor (D) All of the above
- 47. Satellite sends back signal to the earth using :**
- (A) Yagi antenna (B) Dipole antenna  
(C) Chicken-mesh antenna (D) Horn antenna
- 48. For global communication, the minimum number of satellites required is :**
- (A) 6 (B) 4  
(C) 3 (D) 2
- 49. The minimum range of detection by a pulse radar depends upon :**
- (A) Pulse width (B) average transmitted power  
(C) Beam width of antenna (D) Frequency of the radar
- 50. Blind speeds in MTI radar result in :**
- (A) Restriction in the speed of detectable targets  
(B) Blanking of PPI  
(C) No change in phase detector output  
(D) Absorption of EM waves

- 51. In a critically damped system, the damping factor of the system is :**
- (A) Zero (B) Less than unity  
(C) Unity (D) Greater than unity
- 52. The transfer function of an analog control system is defined by :**
- (A) Fourier transform of impulse response (B) Laplace transform of impulse response  
(C) Fourier transform of step response (D) Laplace transform of step response
- 53. Which of the following system is generally preferred ?**
- (A) Under damped (B) Critically damped  
(C) Over damped (D) No damping at all
- 54. The most suitable method for determining the stability and transient response of a system is :**
- (A) Routh Hurwitz criterion (B) Nyquist criterion  
(C) Bode plot (D) Root locus
- 55. The function  $G(s)H(s)$  of a system has no poles in the RHS of s-plane. For the system to be stable, the Nyquist plot of  $G(s)$  must not enclose the :**
- (A) Origin (B) Point  $(-1, j0)$   
(C) Point  $(-1, -j1)$  (D) Point  $(1, j0)$
- 56. The Bode diagram method is applied to :**
- (A) Minimum phase network (B) Non-minimum phase network  
(C) All pass network (D) Every network of the control system
- 57. The gain crossover frequency is the one at which  $|G(j\omega) H(j\omega)|$  is :**
- (A)  $>1$  (B)  $<1$   
(C) Equal to one (D) Equal to constant
- 58. In a PID controller, the offset has increased. In order to reduce it, the integral time constant should be :**
- (A) Decreased (B) Increased  
(C) Made zero (D) Made infinity
- 59. Microwave link repeaters are typically 50 Km apart :**
- (A) because of atmospheric attenuation  
(B) because of earth's curvature  
(C) because of output power limitation  
(D) to ensure that the applied dc voltage is not excessive
- 60. Strapping is used in cavity magnetrons to :**
- (A) Ensure bunching (B) Prevent cathode back heating  
(C) Improve bandwidth (D) Prevent mode jumping

- 61. A reflex klystron is capable of operating at such high frequencies as :**
- (A) 10 GHz (B) 1 GHz  
(C) 20 GHz (D) 80 GHz
- 62. A magnetron has average power of 100 watts and duty cycle 2%. Its peak output power is :**
- (A) 50 W (B) 100 W  
(C) 5000 W (D) 10,000 W
- 63. The microwave amplifier characterized by a very high bandwidth is :**
- (A) The multicavity klystron (B) The traveling wave tube  
(C) The magnetron (D) Two-cavity klystron
- 64. In Gunn diode, gallium arsenide is preferred to silicon because it has :**
- (A) Lower noise at higher frequencies  
(B) High ion mobility  
(C) Better frequency stability  
(D) Suitable empty energy bands which silicon does not have
- 65. The main drawback of the two hole directional coupler is :**
- (A) Low directional coupling (B) Poor directivity  
(C) High SWR (D) Narrow bandwidth
- 66. The minimum number of address lines needed to address each memory location in a  $2048 \times 4$  memory chip is :**
- (A) 10 (B) 11  
(C) 12 (D) 18
- 67. A microprocessor contains ROM chip to store :**
- (A) Control functions (B) Arithmetic functions  
(C) Instruction to execute data (D) Memory functions
- 68. An interrupt in which the external device supplies its address as well as the interrupt request is known as :**
- (A) Vectored interrupt (B) Maskable interrupt  
(C) Non-maskable interrupt (D) Designated interrupt
- 69. The convolution of  $x(n) = \{1, 2, 3, 4, 5\}$  and  $h(n) = \{1\}$  is :**
- (A)  $\{1, 2, 3, 4, 5\}$  (B)  $\{1, 3, 6, 10, 15\}$   
(C)  $\{1, 4, 9, 16, 20\}$  (D)  $\{1, 4, 6, 8, 10\}$



- 70. For a causal and stable discrete-time system, all poles of system function should be :**
- (A) Outside the unit circle in z-plane                      (B) On the unit circle in z-plane  
 (C) Inside the unit circle in z-plane                      (D) No restriction on the poles
- 71. Which of the following transform is used for stability analysis of a continuous-time system ?**
- (A) Fourier transform    (B) Z-transform  
 (C) Laplace transform    (D) Fast Fourier transform
- 72. Fourier transform of the signal  $x(t) = e^{-4|t|}$  is :**
- (A)  $8 / (16 + \omega^2)$     (B)  $-8 / (16 + \omega^2)$   
 (C)  $4 / (16 + \omega^2)$     (D)  $-4 / (16 + \omega^2)$
- 73. Op-amp used as a tuned amplifier has the tuned circuit connected :**
- (A) Across input    (B) Across output  
 (C) Across series impedance at the input                      (D) Across feedback impedance
- 74. The Early effect in a BJT is caused by :**
- (A) Large emitter-base forward bias                              (B) Large collector-base reverse bias  
 (C) Fast turn-ON    (D) Fast turn-OFF
- 75. In a differential amplifier, the CMRR can be improved by using an increased :**
- (A) Emitter resistance    (B) Collector resistance  
 (C) Power supply voltage    (D) Source resistance

## ROUGH WORK