Set B

Subject: ELECTRONICS & TELECOMMUNICATION
ENGINEERING ----- OBJECTIVE

Max. Time: 3 HOURS   **Max. Marks:** 300

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INSTRUCTIONS FOR CANDIDATES

1. Immediately after the commencement of the Examination, you should check that this Booklet does **NOT** have any unprinted or torn or missing page or items, etc. If any defect is found, get it replaced by Complete Question Booklet.

2. **DO NOT** write your name or anything else except the actual answers to the question, anywhere on the test booklet.

3. Handle your test Booklet carefully in such a manner as it may not be mutilated, folded and torn, etc.

4. This Question Booklet contains **50** questions. Each question contains four responses. Choose **only one correct answer** for each question and put a tick mark [√] against it.

5. All the questions are compulsory and carry equal marks. Your total score will depend only on the number of correct responses marked by you in the test booklet.

6. No candidate shall be admitted to the Examination Hall 20 minutes after commencement of distribution of the Test Booklet. The Supervisor of the Examination Centre will be the time-keeper and his decision in this regard is final.

7. No candidate shall have in his possession inside the Examination Hall any book, notebook or loose paper, programmable calculator, mobile phone etc. except his admit card and other stationary permitted by Commission.

8. Immediately after the final bell indicating the closure of the examination, stop making any future markings. You should leave the examination hall after your test booklet is collected by the Invigilator.

9. Violation of any of the above Rules will render the candidate liable to be disqualified from the Examination, and according to the nature and gravity of his/her offence, he/she may be debarred from any Examination and interviews conducted by the Commission.

1. The temperature below which certain materials are antiferromagnetic and above which they are paramagnetic is called

    (a) Curie temperature
    (b) Neel temperature
    (c) Weiss temperature
    (d) None of the above

2. Two wires A and B of the same material and length l and $2l$ have radius r and $2r$ respectively. The ratio of their specific resistance will be.

    (a) $1:1$
    (b) $2:1$
    (c) $4:1$
    (d) none of the above

3. The rms value of a half wave rectified current is $50\ A$. Its rms value for full wave rectification would be

    (a) $100\ A$
    (b) $100/\sqrt{2}\ A$
    (c) $50/\pi\ A$
    (d) $100/\pi\ A$

4. In cell phone, antennas are

    (a) Monopole
    (b) Loops
    (c) Helical
    (d) Lens

5. Two resistors R_1 and R_2 give combined resistance of $4.5\ \Omega$ when in series and $1\ \Omega$ when in parallel. the resistances are

    (a) $2\ \Omega$ and $2.5\ \Omega$
    (b) $1\ \Omega$ and $3.5\ \Omega$
    (c) $1.5\ \Omega$ and $3\ \Omega$
    (d) $4\ \Omega$ and $0.5\ \Omega$

6. As the aperture area of an antenna increases, its gain

    (a) increases
    (b) decreases
    (c) remains same
    (d) behave unpredictably

7. A parallel plate capacitor has capacitance of $10\ \mu F$. If the linear dimensions of the plates are doubled and the separation between them is also doubled the value of the capacitor would be ,

    (a) $50\ \mu F$
    (b) $30\ \mu F$
    (c) $5\ \mu F$
    (d) None of the above

8. A battery is connected to a resistance causing a current of $0.5\ A$ in the circuit. The current drops to $0.4\ A$ when an additional resistance of 5Ω is connected in series. The current will drop to $0.2\ A$ when the resistance is further increased by

    (a) $30\ \Omega$
    (b) $25\ \Omega$
    (c) $12\ \Omega$
    (d) $40\ \Omega$

9. The wavelength of an electromagnetic wave after reflection at angle on a surface,

    (a) remains same as the wavelength perpendicular to the surface
    (b) remains same in free space
    (c) increases in actual direction of propagation
    (d) decreases in actual direction of propagation

10. Antenna commonly used for microwave links is
    (a) loop antenna
    (b) log periodic antenna
    (c) parabolic antenna
    (d) rhombic antenna

11. The base station and the mobile station in cellular networks are generally linked by,
    (a) sky wave propagation
    (b) ground wave propagation
    (c) medium wave propagation
    (d) line of sight propagation

12. Cells are connected in series to increase
    (a) Current rating
    (b) Voltage rating
    (c) Both voltage and current rating
    (d) None of the above

13. An electric heater is rated as $230\,V$, $500\,W$, ac. The value $230\,V$ refers to
    (a) average value
    (b) peak value
    (c) rms value
    (d) peak-to-peak value

14. Form factor for dc supply voltage is always
    (a) zero
    (b) unity
    (c) infinity
    (d) any value between 0 and 1

15. In purely resistive circuits
    (a) power factor is zero
    (b) power consumed is zero
    (c) power factor is unity
    (d) heat produced is zero

16. If the supply frequency of a purely inductive circuit is doubled, the circuit current will be
    (a) halved
    (b) doubled
    (c) same
    (d) one-fourth

17. Power consumed in an ac circuit will be minimum when phase difference between current and applied voltage is,
    (a) $0°$
    (b) $90°$
    (c) $180°$
    (d) $30°$

18. In a pure capacitive circuit, the current will
    (a) lag behind the voltage by $90°$
    (b) lead the voltage by $90°$
    (c) remain in phase with the voltage
    (d) none of these

19. A $10\,\mu F$ capacitor is connected across a $10\,V$ source. The steady state value of current is
    (a) $10\,\mu A$
    (b) $10^6\,A$
    (c) $1\,A$
    (d) zero

20. A two port network is symmetrical if
    (a) $Z_{12} = Z_{22}$
    (b) $Z_{12} = Z_{21}$
    (c) $Z_{11} = Z_{22}$
    (d) $Z_{12} = -Z_{22}$

21. A resistor of $3\,\Omega$ is connected in series with an inductor of $9\,H$. The time constant of the circuit is
    (a) 3 seconds
    (b) 12 seconds
    (c) 1/3 seconds
    (d) 27 seconds

22. The response of a network is decided by the location of
    (a) its zeros
    (b) its poles
    (c) both zeros and poles
    (d) neither zeros nor poles

23. Full scale deflection current of an ammeter is 5A. Ammeter resistance is 3Ω. In order to measure a circuit current of 6A, the value of shunt must be

(a) 1 Ω
(b) 2 Ω
(c) 3 Ω
(d) none of the above

24. The mobility of an electron in a conductor is expressed in terms of

(a) cm^2/V-s
(b) cm/V-s
(c) cm^2/V
(d) cm^2/s

25. A BJT is said to be operating in saturation region if,

(a) base-emitter and base-collector junctions are reverse biased
(b) base-emitter junction is reverse and base-collector junction is forward biased
(c) base-emitter junction is forward and base-collector junction is reverse biased
(d) base-emitter and base-collector junctions are forward biased

26. A permanent magnet moving coil meter can be used for

(a) ac only
(b) dc only
(c) both ac and dc
(d) none of the above

27. An op-amp has a common mode gain of 0.01 and differential mode gain of 10^5. Its CMRR would be
(a) 10^{-7}
(b) 10^{-3}
(c) 10^7
(d) 10^3

28. The logical expression $Y = ABC + \bar{A}B + AB\bar{C}$ is equivalent to

(a) $Y = \bar{A}$
(b) $Y = B$
(c) $Y = ABC$
(d) $Y = \bar{A}B$

29. If the memory chip size is 256×1 bits, then the number of chips required to make up 1K bytes of memory is

(a) 32
(b) 24
(c) 12
(d) 8

30. A given power supply is capable of providing 6 A for 3.5 hours. Its ampere-hour rating is

(a) 0.58 Ah
(b) 2.1 Ah
(c) 21 Ah
(d) 58 Ah

31. An ideal OP-AMP has the following characteristics

(a) $R_i = \infty, A = \infty, R_o = 0$
(b) $R_i = 0, A = \infty, R_o = 0$
(c) $R_i = \infty, A = \infty, R_o = \infty$
(d) $R_i = 0, A = \infty, R_o = \infty$

32. The number of valence electrons in pentavalent impurity is

(a) 1
(b) 3
(c) 4
(d) 5

33. In a bipolar junction transistor

(a) $\beta = \alpha/(\alpha + 1)$
(b) $\beta = \alpha/(1 - \alpha)$
(c) $\alpha = \beta/(\beta - 1)$
(d) $\alpha = (\beta + 1)/\beta$

3

34. In a 7 segment LED display, the number of segments activated to display the number 3 is,

(a) 5
(b) 1
(c) 2
(d) none of the above

35. A The dc gain of a system represented by the transfer function $12 / \{(s + 2)(s + 3)\}$ is

(a) 1
(b) 2
(c) 5
(d) 10

36. The frequency at which phase angle is zero is called

(a) corner
(b) stability limit
(c) resonant
(d) none of the above

37. In an integral controller

(a) the output is proportional to the input
(b) the output is proportional to the rate of change of the input
(c) the rate of change of output is proportional to the input
(d) none of the above

38. A proportional controller is basically a,

(a) an integrating amplifier
(b) an amplifier with adjustable gain
(c) an amplifier with infinite gain
(d) an amplifier with zero gain

39. A system has its two poles on the negative real axis and one pair of poles lies on $j\omega$ axis. The system is

(a) stable
(b) unstable
(c) limitedly stable
(d) either (a) or (b)

40. For type 0 system and unit ramp input the steady state error is
(a) 0
(b) infinity
(c) 1
(d) $1/K_v$

41. Which of the following is not possible in NAND SR flip-flop,

(a) $S = 0, R = 0$
(b) $S = 0, R = 1$
(c) $S = 1, R = 0$
(d) $S = 1, R = 1$

42. PROM is

(a) permanent read only memory
(b) polarized read only memory
(c) programmable read only memory
(d) positive read only memory

43. The hex number $8E_{16}$ represents

(a) 10001111_2
(b) 11001110_2
(c) 10001110_2
(d) 11001111_2

44. The ASCII is the code for

(a) alphabets only
(b) numbers only
(c) alpha-numeric and other common symbols
(d) none of the above

45. In NAND SR flip-flop no change occurs during

  (a) $S = 0, R = 0$
  (b) $S = 0, R = 1$
  (c) $S = 1, R = 0$
  (d) $S = 1, R = 1$

46. Which of the logic circuit family has least power dissipation?

  (a) TTL
  (b) ECL
  (c) CMOS
  (d) none of the above

47. Radio broadcast is generally

  (a) AM signal
  (b) FM signal
  (c) both AM and FM signal
  (d) neither AM or FM

48. The decibel is a measure of

  (a) current
  (b) voltage
  (c) power
  (d) power level

49. The frequency range of 300 KHz to 3000 KHz

  (a) Low frequency
  (b) Medium frequency
  (c) High frequency
  (d) Very high frequency

50. Which of the following is a digital transducer?

  (a) strain gauge
  (b) encoder
  (c) thermistor
  (d) LVDT