ENGINEERING KNOWLEDGE TEST (EKT)
ELECTRICAL AND ELECTRONICS STREAM

Set No 1/15 **Booklet Series 'J'**

Instructions for Candidates **Time Allotted: 45 Minutes**

1. **Total No. of Questions 50. Each Question is of three marks.**
2. **One mark will be deducted for every wrong answer.**
3. **No mark will be deducted for un-attempted questions.**
4. **Do not write on the Question Paper or make any mark on it.**

Q1. If x=a(cos t + t sin t), y=a(sin t – t cos t). The value of $\frac{dy}{dx}$ is

(a) cos t (b) sin t (c) tan t (d) $\sec^2 t$

Q2. The area of three faces of a cuboid are in the ratio 2:3:4 and its volume is 9000 cm^3. The length of the shortest edge is

(a) 15 cm (b) 30 cm (c) 20 cm (d) 60 cm

Q3. $\int \frac{dx}{xlogx}$ is equal to

(a) log x+x+c (b) log(logx)+c (c) xlogx+c (d) $\frac{\log x}{x}$+c

Q4. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

(a) 8/2 (b) 9/20 (c) 8/15 (d) 2/20

Q5. The projection of a vector on another vector is

(a) Scalar (b) Vector
(c) neither vector nor scalar (d) either scalar or vector

Q6. In MKS system, we measure

(a) mass in kilogram (b) distance in meter
(c) time in second (d) all of these

Q7. When the separation between two charges is made four times, the force between them

(a) increases four times (b) decreases four times
(c) increases sixteen times (d) decreases sixteen times

Q8. When a conductor cuts magnetic flux, an emf is induced in the conductor. This is known as

(a) Joule's law (b) Faraday's law
(c) Coulomb's law (d) Ampere's law

Q9. X-rays are used for the study of crystal structure because

(a) X-rays are completely absorbed by the crystal
(b) the wavelength of X-ray is of the same order of magnitude in the inter-atomic spacing in crystals
(c) the wavelength of X-rays is very small in comparison with the inter-atomic spacing in crystals
(d) the crystals are completely transparent to X-rays

Q10. A radioactive isotope has a half-life of 10 days. If today there are 125 g of it left, what was its original weight 40 days earlier
(a) 600 g (b) 1000 g (c) 1250 g (d) 2000 g

Q11. Angles project true size only when the plane containing the angle and plane of projection are
(a) Aligned (b) Adjacent (c) Perpendicular (d) Parallel

Q12. Tesla is a measure of
(a) magnetic flux density (b) electric flux density
(c) magnetic potential (d) electric potential

Q13. Admittance is reciprocal of
(a) susceptance (b) impedance (c) reactance (d) conductance

Q14. _____is an active filter
(a) RC filter (b) notch filter (c) Butterworth filter (d) band pass filter

Q15. For transmission line load matching over a range of frequencies, it is best to use a
(a) Balun (b) broadband directional coupler
(c) double stub (d) single stub

Q16. Emitter follower is used for
(a) reducing the gain (b) increasing the distortion
(c) impedance matching (d) none of these

Q17. Binary equivalent of $(45)_{10}$ is
(a) $(11101)_2$ (b) $(11110)_2$ (c) $(101101)_2$ (d) $(110101)_2$

Q18. In Computer memory size K indicates Kilo, which is equal to
(a) 1000 (b) 1024 (c) 100 (d) 10000

Q19. An astable multivibrator has
(a) no stable state (b) one stable state (c) three stable states (d) two stable states

Q20. An ideal Op Amp has
(a) infinite input and output impedance
(b) very low input and output impedance
(c) low input impedance and very high output impedance
(d) infinite input impedance and zero output impedance

Q21. An instruction used to set the carry flag in a computer can be classified as a
(a) data transfer instruction (b) arithmetic instruction
(c) logical instruction (d) program control instruction

Q22. An FET is a
(a) bipolar semiconductor device (b) unipolar semiconductor device
(c) non semiconductor device (d) both (a) and (c)

Q23. For Gunn diodes, semiconductor material preferred is
(a) Silicon (b) Germanium (c) Gallium Arsenide (d) all of these

Q24. In a JFET drain current is maximum when V_{GS} is
(a) zero (b) negative (c) positive (d) equal to Vp

Q25. The output of Laser is

(a) Infrared (b) polarised (c) narrow beam (d) coherent

Q26. As compared to a closed loop system an open loop system is

(a) more stable as well as more accurate
(b) less stable as well as less accurate
(c) more stable but less accurate
(d) less stable but more accurate

Q27. Transfer function of a system is used to calculate

(a) the steady state gain (b) the time constant
(c) the order of the system (d) the output for a given input

Q28. In a closed loop control system

(a) control action depends upon the output and also on the input command
(b) output signal is fed back to be compared with the reference signal
(c) the accuracy is better than in the open loop system
(d) all of the above

Q29. The difference of the reference input and the actual output signal is called

(a) error signal (b) controlling signal (c) actuating signal (d) transfer function

Q30. If the transfer function of a system is $\frac{1}{Ts+1}$, the steady state error to unit step input is

(a) T (b) zero (c) infinite (d) none of these

Q31. In a PID controller,the values of proportional, integral and derivative are dependent on

(a) future, past and present errors respectively
(b) present, past and future errors respectively
(c) past, present and future errors respectively
(d) present, future and past errors respectively

Q32. The inverse Laplace transform of $\frac{2}{s+1}$ is

(a) $2(t+1)$ (b) $2e^{-t}$ (c) $2e^{t}$ (d) e^{-2t}

Q33. The signal is extended from 96KHz to 100KHz, so the minimum sampling frequency required is

(a) 8KHz (b) 200KHz (c) 4KHz (d) 100KHz

Q34. A differentiation circuit has a

(a) very high time constant (b) very low time constant
(c) infinite time constant (d) zero time constant

Q35. Ideally Voltage Standing Wave Ratio (VSWR) should be

(a) as large as possible (b) as small as possible
(c) as close to unity as possible (d) infinity

Q36. Following is/are a property/properties of quantization

(a) it is an nonlinear process (b) it is an irreversible process
(c) it maps a larger set of input values to a smaller set (d) all of these

Q37. Most commonly used filter in SSB generation are
(a) mechanical filters (b) RC filters (c) LC filters (d) low pass filters

Q38. If the antenna diameter in a radar system is increased by a factor of 4, the maximum range will be increased by a factor of
(a) 2 (b) 4 (c) 8 (d) 16

Q39. Following type of multiplexing cannot be used for analog signalling
(a) FDM (b) TDM (c) CDM (d) None of these

Q40. In TDM systems, channel separation is done with the use of
(a) AND gates (b) band-pass filters (c) differentiator circuit (d) integrator circuit

Q41. Data-link layer of the OSI model specifies
(a) data link procedures that provide for the exchange of data via frames that can be sent and received
(b) the interface between the X.25 network and packet mode device
(c) the virtual circuit interface to packet-switched service
(d) all of the above

Q42. FDDI is a
(a) ring network (b) star network (c) mesh network (d) bus based network

Q43. Which of the following TCP/IP protocol allows an application program on one machine to send a datagram to an application program on another machine?
(a) UDP (b) VMTP (c) X.25 (d) SMTP

Q44. The main difference between synchronous and asynchronous transmission is that
(a) the clocking is derived from the data in synchronous transmission
(b) the clocking is mixed with the data in asynchronous transmission
(c) the pulse height is different
(d) the bandwidth required is different

Q45. Transducer is a device which
(a) converts one form of power in to the other (b) is similar to transformer
(c) converts one form of energy in to other (d) helps in measuring electricity

Q46. Principle of hysteresis is not used in
(a) electrical water geyser (b) electrical motor (c) multi-vibrators (d) Schmitt trigger

Q47. Which of the following motors would not be suitable for use as servomotors?
(a) AC induction motor (b) brushless AC motor
(c) stepper motor (d) permanent magnet DC motor

Q48. The stator of an induction motor is made of
(a) carbon (b) wood (c) copper stampings (d) silicon steel laminators

Q49. An ideal DC generator is one that has _____ voltage regulation
(a) low (b) high (c) zero (d) positive

Q50. Commutator is used in
(a) DC generator (b) AC generator (c) invertors (d) convertors