Reg. No……..… Name:……..……

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: EE 352

Course Name: COMREHENSIVE EXAMINATION (EE)

Maximum marks: 50 Duration : 1 hours

Instructions:

1. ***Each question carries one mark. No negative marks for wrong answers***
2. ***Total number of questions: 50***
3. ***All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct. Mark the most appropriate answer***
4. ***If more than one option is chosen, it will not be considered for valuation.***
5. ***Calculators are not permitted.***

1. Superposition theorem cannot be applied in linear circuits to find out the following variable
   A. voltage B. current C. power D. none of these

2. The source impedance of a non- ideal voltage source is Zs = 6+j 8 Ω and is connected to a resistive load. What should be the load for maximum power transfer.

   A. 6 Ω B. 8 Ω C. 10 Ω D. 14 Ω

3. If there are 4 branches and 3 nodes then number of links in a co-tree are?

   A. 2 B. 4 C. 6 D. 8

4. A three element RLC-series circuit is changed to a parallel combination in which all elements are in parallel. As compared to series mode, the natural frequency (w_n) and damping factor (ξ) for the parallel model will have:

   A. same w_n and same ξ B. different w_n and same ξ
   C. same w_n and different ξ D. different w_n and different ξ.

5. The Laplace transform of a circuit current is $I(s) = (5s^2+2s+6)/[s(s^2+3s+3)]$. The initial value i(o) is

   A. 2 A B. 5A C. 6A D. infinity

6. A two-port network is represented by the following equations,

   $I_1=V_1 - 0.5V_2$, $1_2= -V_1 + V_2$, Z parameters are given by Z=

   A. $Z=\begin{bmatrix}1 & -0.5\\ -1 & 1\end{bmatrix}$, B. $Z=\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$, C. $Z=\begin{bmatrix}1 & -2\\ -1 & 1\end{bmatrix}$ D. $Z=\begin{bmatrix}2 & 1\\ 2 & 2\end{bmatrix}$

7. The degree of the numerator polynomial and denominator polynomial in a driving point function may differ by?

A. 0 B. 1 C. 0 or 1 D. 2

8. Which statement is true for a voltage divider self-biasing circuit?

A. improvement in Stability factors, B. used for both BJT & JFET
C. can be modified for bias compensation of BJT, D. All the above

9. The drain current I_D for an n-channel JFET at a gate to source voltage V_{GS}= - 1V is 16mA. The pinch off voltage Vp=5V. Determine I_D at V_{GS} = - 2V.

A. 4 mA B. 9 mA C. 6.4mA D. 32 mA

10. Which statement is FALSE for a Class B- push pull amplifier

A. Maximum efficiency is 78.5%, B. No even harmonic distortion,
C. Eliminates cross over distortion, D. None of the above

11. The feedback exists in a common emitter amplifier system with R_E unbypassed (Emitter bypass capacitor is removed) is

A. Current series FB B. Voltage series FB
C. Current shunt FB D. Voltage shunt FB

12. The input offset current of an OPAMP is in the range of

A. nA B. μA C. (0.1-1)mA D. 100mA

13. Which statement given below is true for a Schmitt trigger

i) converts sine wave to rectangular wave, ii) used as memory iii) used as amplifier iv) acts as regenerative comparator

A. i & ii only, B. All, C. i, ii & iv D. ii & iii only

14. Which statement is NOT applicable to slew rate limitation in OPAMPS

A. restriction on signal frequency B. restriction on signal magnitude
C. affects the nonlinear distortion D. affects offset voltages and bias currents

15. A 4-pole dc machine is having double layer lap winding arranged in 80 slots. Winding resistance is 0.2 Ω per conductor. Determine the armature resistance (Ra).

A. 8 ohms B. 4 ohms C. 2 ohms D. 1 ohm

16. The equalizer connections are used for

A. Lap winding B. Wave winding
C. Wave winding with dummy coils D. Not for dc windings

17. DC Series generator is used for

A. charging batteries, B. booster in distribution systems,
C. Arc welding D. Lamp loads

18. Retardation test on dc shunt motor is conducted to determine

A. stray loss only, B. Stray loss and moment of inertia,

C. Temperature rise. D. effect of flux distortion on iron loss

19. The resistance of the transformer referred to low voltage side of a 240/120 V 1–phase transformer with R_1=0.1 ohm and R_2=0.03 ohm is

A. 0.055 ohm B. 0.43 ohm C. 0.22 ohm D. 0.1075 ohm

20. For a 1-phase transformer the maximum regulation occurs at 0.5 pf lagging, then the zero regulation occurs at a power factor equals to……

A. upf B. 0.5 lead C. 0.707 lead D. 0.866 lead

21. Which among the following statement regarding a star-delta 3 phase transformer is not true

A. no problem with third harmonic components

B. unbalanced loads can be handled

C. can operate this connection in parallel with delta-delta

D. there is a 30 Degree phase shift between Secondary to Primary phase voltages

22. A 4 bit pattern that will produce the same pattern when 2's complement is taken.

A. 0001 B. 0010 C. 0100 D. 1000

23. The logical expression F=A +$\bar{A}$B can be simplified to

A. F=AB, B. F=A+B C. F= 1 D. F= $\bar{A}$ +B

24. In a one-digit BCD adder, the number of bits in the output is

A. 3 B. 4 C. 5 D. 6

25. If D-FF is modified with switch-tail ring counter connection, the circuit becomes

A. SR FF, B. D FF C. JK FF D. T FF

26. The number of Flip Flops required to build Mod-13 counter is

A . 2 B. 3 C. 4 D. 5

27. The capacity of a Memory chip is 8192 Bytes. The number of address lines required are

A. 11 B. 12 C. 13 D. 14

28. The resistor corresponding to the LSB of a 4-bit Weighted resistor DAC is 64 K ohms. Then the value of resistor assigned to MSB will be

A. 512 k ohm B. 64 k ohm C. 16 k ohm D. 8 k ohm

29. The usual spans with R.C.C. poles are

A. 30-50 m, B. 50-80 m, C, 80-100 m, D. 300-500 m

30. Which one is not an advantage of bundle conductors in transmission lines:

A. Increased surface area

B. Inductance reduces and capacitance increases

C. Improvement in SIL and reduction in corona loss
D. Increase in surrounding voltage gradient

31. The surge impedance of a 100 km long underground cable is 100 ohms. For a 50 km long cable it will be

A. 25 ohms B. 50 ohms C. 100 ohms D. 200 ohms

32. Bulk power transfer is done through HVDC line because of

A. reduced line power losses B. reduced harmonics
C. low cost of devices, D. simple and cheaper protection

33. Buchholz relay is commonly used for protection of

A. Feeders B. Transformers C. Generators D. bus bars

34. Mho relay is normally used for the protection of

A. Long transmission line B. short line C. Generators D. Transformer

35. In a simple series mass-damper-spring (M-B-K) system the natural frequency is given by

A. $\sqrt{(K/M)}$ B. K/M C. $\sqrt{(M/K)}$ D. $\sqrt{(B/M)}$

36. For a second order system with damping factor $\xi=0$, the maximum overshoot (Mp) and resonance peak (Mr) will be

A. Mp = 100%, Mr = 100% B. Mp =100%, Mr = infinity,
C. Mp = 0, Mr = 100% D. Mp = 0%, Mr =100%

37. The steady state error for unit step input applied to ufb system with $G(s)= 5/[s^2(s+2)]$ is

A. infinity B. 40 C. 0.825 D. 0

38. The breakaway point in the root locus of the given transfer function $G(s)H(s) = k(s+3)/s(s+2)$ will be at

A. Complex conjugates B. two –ve real axis points
B. Only one break away point D. one in RHP and one in LHP

39. For a stable system GM in dB and PM in degrees should be

A. both +ve B. GM +ve. PM -ve C. GM -ve. PM +ve D. both –ve

40. Phase angle of the system with $G(s) = e^{-s} / (s+1)$, at w =1 rad/s will be…

A. $+ 12^0$ B. $- 45^0$ C. $- 102^0$ D. -180^0

41. The total derivative of the function 'xy' is

A. $xdy+ ydx$ B. $xdx+ ydy$ C. $dx+ dy$ D. $dxdy$

42. For the differential equation $\frac{dy}{dt} + 5y=0$ with $y(0) =1$ the general solution is

A) e^{5t} B) e^{-5t} C) $5e^{-5t}$ D) none of these

43. The radial component of velocity for a particle moving in a circular path is

A) zero B) radius itself C) variable D) none of the above

44. In which Quadrant the HP comes above XY line and VP comes below XY line for orthographic projection?

A) First Quadrant B) Second Quadrant C) Third Quadrant D) Fourth Quadrant

45. The force applied on a body of mass 100 kg to produce an acceleration of 5 m/S^2 is

A) 20 N B) 100 N C) 500 N D) None of these

46. Which was the major green building rating system developed by TERI

A) GRIHA B) LEED C) BREEAM D) CASBEE

47. Which stage is directly responsible for the technical functioning of the product

A) engineering function B) research function C) manufacturing function D) commercial function

48. The first full-scale and usually fully functional forms of a new design is called

A) Model B) prototype C) rapid prototype D) design attribute

49. The Air Pollution and Control Act, popularly known as the 'Air Act' was passed for the first time in US in

A) 1955 B) 1999 C) 2004 D) 2015

50. Probability of a product successfully operation for a specific period of time is called

A) reliability B) durability C) conformance D) serviceability

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