Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE COMPREHENSIVE EXAMINATION, MAY 2019

Course Code: EE352

Course name: COMPREHENSIVE EXAM (EE)

Max. Marks: 50   Duration: 1Hour

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.
                   (4) If more than one option is chosen, it will not be considered for valuation.
                   (5) Calculators are not permitted

PART A- COMMON COURSES

1. The infinite series $\sum\limits_{n=1}^{\infty} \dfrac{1}{n^{\,p}}$

   a) Converges if $p < 1$ b) Converges if $p > 1$ c) Converges if $p = 1$ d) Diverges if $p > 1$

2. The Wronskian of $\cos x$ and $\sin x$ is

   a) 0 b) $cos^2 x - sin^2 x$ c) $2\cos x \sin x$ d) 1

3. The equivalent stiffness of two springs of stiffness s1 and s2 joined in series is

   a) s1s2/(s1+s2)   b) (s1/s2)/(s1+s2)   c) s1+s2   d) s1s2

4. A bullet of mass 0.03kg moving with a speed of 400m/s penetrates 12cm into a fixed block of wood. The average force exerted by the wood on the bullet will be

   a) 10kN   b) 20kN   c) 0kN   d) 15kN

5. Which among the following is not a Functional constraint?

   a) Overall Geometry   b) Forces Involved   c) Quality control   d) Materials to be used

6. A structured planning method used to evaluate weakness, strength ,opportunities and threats of design:

   a) SWOT analysis   b) Design analysis   c) WOST analysis   d) Matrix design

7. Eutrophication of water bodies is caused by the presence of

   a) excessive dissolved oxygen   b) Excessive dissolved CO_2 c) phosphorous and nitrogen nutrients   d) Algae

8. A major advantage of Pyrolysis in converting biomass to energy is

   a) its heating to 1000^0 F   b) that Carbon Dioxide is not produced   c) the Oxygen generated as the by-product   d) the absorption CO_2 during the process

9. When the projectors are parallel to each other and also perpendicular to the plane, the projection is called

a) Perspective projection   b) Oblique projection   c) Isometric projection   d) Orthographic projection

10. In AutoCAD, to obtain parallel lines, concentric circles and parallel curves; _____ is used

a) Array   b) Fillet   c) Copy   d) Offset

PART B- CORE COURSES

11. Self-bias provides

a) Stable Q point   b) High input impedance   c) Large voltage gain   d) High base current

12. What is the range of an FET input impedance?

a) 10Ω to $1k\Omega$ b) $1k\Omega$ to $50k\Omega$ c) $50k\Omega$ to $250k\Omega$ d) $1M\Omega$ to several hundred $M\Omega$

13. The feed back signal in ____oscillator is derived from an inductive divider

a) Hartley   b) Colpitts   c) Crystal   d) Wien bridge

14. Open loop gain of an ideal op-amp is

a) high   b) Infinite   c) low   d) zero

15. A certain differential Amplifier using op-amp, has differential voltage gain of 2000 and common mode gain of 0.2. Determine CMRR in dB

a) 50dB   b) 60dB   c) 80dB   d) 70dB

16. _____ multivibrator is a square wave oscillator

a) Monostable   b) Astable   c) Bistable   d) None of the above

17. Zero crossing detector is basically

a) A Sine wave to square wave converter   b) A Square wave to sine wave converter   c) A sine wave to triangle wave converter   d) A sine wave to ramp voltage converter

18. Two's compliment of given binary number 11010 is

a) 10001   b) 00100   c) 00110   d) 00101

19. Which of the following is true?

(A+B)(A+C) is equal to

a) AC+BC   b) AB+C   c) A+BC   d) AC+B

20. A BCD –to-decimal decoder is

a) A 3-line to 8-line decoder   b) A 1-line to 10 line decoder   c) A 4-line to 10-line decoder   d) Any lines –to 10 line decoder

21. The race around condition occurs in a J-K flip flop when

a) Both inputs are 0.   b) Both inputs are 1   c) The inputs are complementary   d) Any one of the input

combination is present

22. A shift register can be used for

     a) Parallel to serial conversion only   b) Serial to parallel conversion only   c) Digital time delay only   d) All of the above

23. Another name for twisted ring counter is

     a) Decade counter   b) Synchronous counter   c) Johnson's counter   d) Universal shift register

24. VHDL Stands for

     a) Verilog hardware description language   b) Vast hierarchical description language   c) VHSIC hardware description language   d) VME bus description language

25. Transfer function is applicable to

     a) Linear time variant system   b) Linear time invariant system   c) Nonlinear system   d) None of the above

26. A linear time invariant system initially at rest, when subjected to a unit step input, gives a response $y(t)= te^{-t}$,t>0. The transfer function of the system is

     a) $1/(s+1)^2$ b) $1/s(s+1)^2$ c) $s/(s+1)^2$ d) $1/s(s+1)$

27. For a type 2 system, the steady state error for a unit ramp input is

     a) zero   b) finite   c) infinite   d) depends on the system

28. How many asymptotes will the root locus of an open loop transfer function with 3 zeroes and 2 poles have?

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

29. The maximum possible negative slope and final slope of the bode magnitude plot of a transfer function with 3 poles and 2 zeroes are respectively (all values in dB/decade)

     a) -40, -20   b) -60, -40   c) -60, -20   d) -40, -40

30. Consider a feedback system with gain margin of about 30. At what point does Nyquist plot crosses negative real axis?

     a) -3   b) -0.3   c) -30   d) -300

31. The frequency at which phase of open loop transfer function is 180^0 is called

     a) Corner frequency   b) Cut off frequency   c) Phase cross over frequency   d) Resonant frequency

32. An ac source of V=50V and f=50 Hz, having an internal impedance of (1+j2) Ω is connected across a load. For maximum power transfer, the load impedance should be

     a) (1+ j2) Ω   b) (1- j2) Ω   c) (2+j4) Ω   d) j2 Ω

33. The no. of independent loops for a network with N nodes and B branches is

a) N-1   b) B-N   c) B-N+1   d) Independent of number of nodes

34. A parallel combination of two resistors, each of R Ω, is in series with a parallel combination of two capacitors of capacitance C each is fed from a DC source. The time constant of the circuit would be

a) CR   b) 2CR   c) CR/4   d) CR/2

35. When two coupled coils of equal self inductances are connected in series in one way, the net inductance is 12 mH. When they are connected in the other way, the net inductance is 4 mH. The maximum value of net inductance when they are connected in parallel in a suitable way is

a) 2mH   b) 3mH   c) 4mH   d) 6mH

36. A two-port network is symmetrical if

a) $Z_{12}=Z_{21}$ b) AD-BC=1   c) $Z_{11}=Z_{22}$ d) $h_{12}= - h_{21}$

37. A polynomial q(s) is Hurwitz if

a) q(s) is real when s is real   b) q(s) is real and have real roots which are zero or negative   c) q(s) has conjugate pair of complex roots   d) None of these

38. Choose a conventional source of energy from the following:

a) Nuclear   b) Wind   c) Solar   d) Tidal

39. Transposition of a 3 phase transmission line helps in _____ of the 3 phases

a) To find L and C   b) Increasing L and C   c) To reduce supply frequency   d) Equalizing L and C

40. Pin insulators are normally used up to voltage of about

a) 100 kV   b) 66kV   c) 33kV   d) 250kV

41. HVDC transmission lines are more economical for

a) Long distance transmission   b) Short distance transmission   c) Interconnected System   d) Hybrid System

42. Distance Relays are used for the protection of

a) Generator   b) Transformer   c) Transmission line   d) Bus bar

43. Buchholz relay is used to protect against

a) Internal fault   b) External fault   c) Rotor fault   d) All of the above

44. Select a suitable winding for DC generator for generating large current

a) Progressive wave winding   b) Lap winding   c) Retrogressive wave winding   d) Wave winding

45. The efficiency of a dc machine is maximum when

a) Copper loss = hysteresis loss   b) Hysteresis loss = Eddy current loss   c) Eddy current loss = Copper Loss   d) Constant Loss= Variable Loss

46. Starters are used in DC motors because

	a)	These motors have low starting torque	b)	These motors are not self starting	c)	Back emf of these motors is high initially	d)	To restrict the armature current at starting

47. Identify the circuit element that stores energy in the electromagnetic field

	a)	Inductance	b)	Condenser	c)	Variable resistor	d)	resistance

48. Magnetising impedance of a transformer is determined by

	a)	SC Test	b)	OC Test	c)	Both (a) and (b)	d)	Load Test

49. Satisfactory operation of three phase transformers in parallel requires

	a)	Same voltage rating, polarity, phase sequence, percentage impedance and vector group	b)	Same voltage rating, frequency and vector group	c)	Same voltage rating, polarity, frequency and percentage impedance	d)	Same voltage rating, frequency and percentage impedance

50. The purpose of providing dummy coil in dc generator is

	a)	For mechanical Balance	b)	To reduce Eddy current loss	c)	To reduce Hysteresis loss	d)	To increase efficiency of generator

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