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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R,S) / S6 (PT) / (WP) Examination April 2025 (2019 Scheme)

Course Code: EET 308

Course name: COMPREHENSIVE COURSE WORK

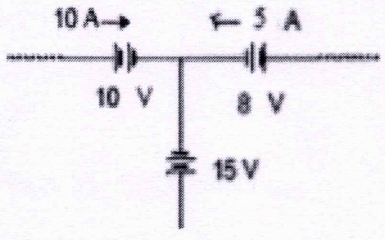
Max. Marks: 50 Duration: 1Hour

Instruction ***(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.

1. Kirchoff's laws are applicable to _____?

a) linear and bilateral circuits only. b) linear and unilateral circuits only. c) All electrical circuits. d) Non-linear circuits only.

2. Obtain the surplus power in the circuit segment shown:

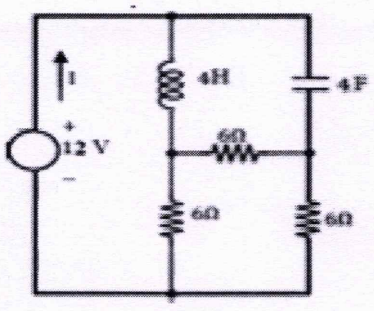


a) 85W b) -85W c) 140W d) 365W

3. What kind of an electric circuit has a time constant?

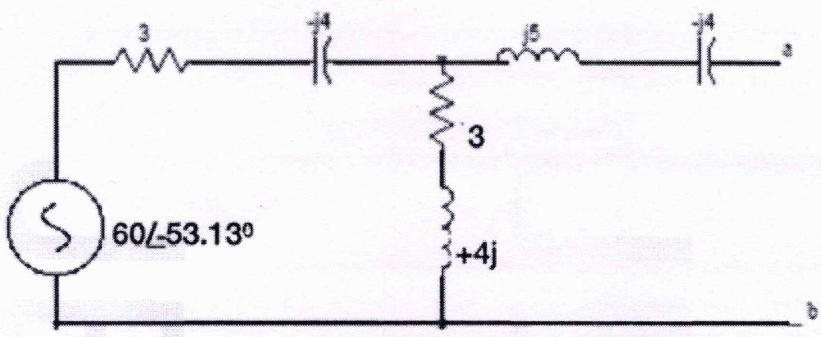
a) Resistive b) Resistive-Inductive c) Capacitive d) Resistive-Inductive-Capacitive

4. Find the voltage across the capacitor:



a) 12V b) 4V c) 6V d) 3V

5. Find the Thevenin's voltage in volts across a-b?



a) $30 \angle 53.13^0$ b) 50 c) $60 \angle -53.13^0$ d) 30

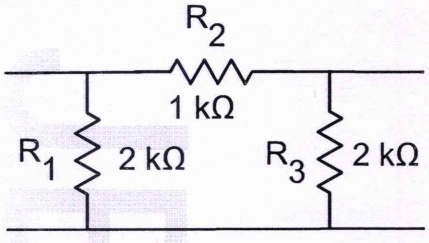
6. In which circuit is the superposition principle not applicable?

a) RLC b) Transformer equivalent circuit c) Zener diode circuit d) Heater circuit

7. In a cascaded circuit system which parameters are more useful for computing gains?

a) Y b) H c) T d) Z

8. What is the transfer impedance z_{12} in the given circuit?

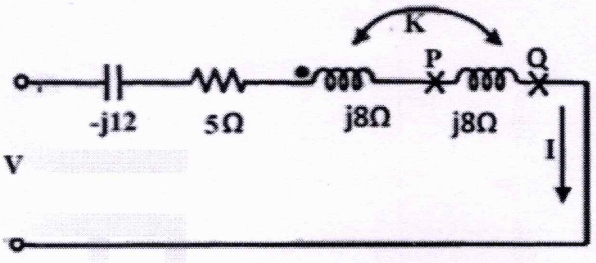


a) 1k b) 0.8k c) 0.4k d) 2k

9. When is Thevenin's impedance same in Thevenin's and Norton's equivalent circuits?

a) This is never true b) When it is a pure resistive circuit c) Only in DC circuits d) Always; source transformation

10. What's the coupling coefficient in the given circuit if current and voltage are in phase and Q is dotted?



a) K=1 b) K=0.5 c) K=0.25 d) K=0

11 What will be the frequency of the output from a JK flip – flop, when J = 1, K = 1, and a 20kHz clock with pulse waveform is given

a) 10kHz b) 20kHz c) 40kHz d) 0; DC

12 Which of the following options represent the correct reduction of XY'Z + X'Y'Z ?

a) 0 b) Y'Z c) X+Y d) 2XY

13 How many 4 – bit parallel binary adders will be required to construct a 4 – bit parallel multiplier?

a) 1 b) 2 c) 4 d) 8

14 All logic operations can be obtained by means of _____ operations.

a) AND, NAND b) NOR, NAND c) OR, NOR d) OR, NOT

15 A D flip-flop can be constructed from an _____ flip-flop.

a) J-R b) S-R c) T d) S-K

16 The register is a type of _____

a) Combinational b) Latches c) CPU d) Sequential

17 Ring shift and Johnson counters are _____

a) Synchronous b) Asynchronous c) True binary counters d) Synchronous and Binary counters

18 The representation of octal number $(111.1)_8$ in decimal is _____

a) 73.125 b) -888.8 c) 800.1 d) 13.9

19 To keep output data accurate, 4-bit series-in, parallel-out shift registers employ a

a) Divide-by-4 clock pulse b) Multiplexer c) Strobe line d) Sequence generator

20 The code where all successive numbers differ from their preceding number by single bit is_____.

a) Binary b) Alphanumeric c) Excess-3 d) Gray

21 A 220 V, DC shunt motor is operating at a speed of 1440 rpm. The armature resistance is 1.0 Ω and armature current is 10 A. If the excitation of the machine is reduced by 10%, the extra resistance in ohms to be put in the armature circuit to maintain the same speed and torque will be

a) 3.1Ω b) 1.79 Ω c) 18.9 Ω d) 2.1 Ω

22 A 4-point starter is used to start and control the speed of a _____.

a) Armature control of shunt motor b) Series motor c) Induction motor d) Field weakening of a shunt motor

23 What are the materials used for brushes in dc machines?

a) Aluminium b) Steel c) Iron d) Carbon

24 The armature of DC motor is laminated to reduce _____.

a) Hysteresis loss b) Eddy current loss c) sparking d) Commutation loss

25 In a DC machine, rectification provided with commutator is _____ rectification.

a) Full wave b) Semi Controlled c) Half wave d) Fully controlled

26 What is the type of flux in a transformer?

a) Constant electric flux b) Constant magnetic flux c) Alternating Electric flux d) Alternating magnetic flux

27 A 15 KVA transformer is constructed to a turns ratio of N1/N2 = 10. The impedance of primary winding is 1+j2 ohms and of secondary winding is 0.2+j0.3 ohms. What will be the impedance of the transformer when referred to primary?

a) 1.2+2.3j b) 21+32j c) 1+2j d) 3+5j

28 For a 10kVA transformer with a turn ratio of 0.4 what amount of total power is transferred inductively?

a) 4kVA b) 6kVA c) 10kVA d) 0

29 The principle of working of a welding transformer is that the weld is a ____ circuit.

a) Finite reactance b) Open c) Short d) Finite resistance

30 A transformer having maximum efficiency at 75% full load will have ratio of iron loss and full load copper loss equal to _____

a) 3/4 b) 4/3 c) 9/16 d) 16/9

31 Determine the odd component of the signal: x(t)=cost+sint.

a) sin 2t b) sin t c) cos t d) cos t+sin t

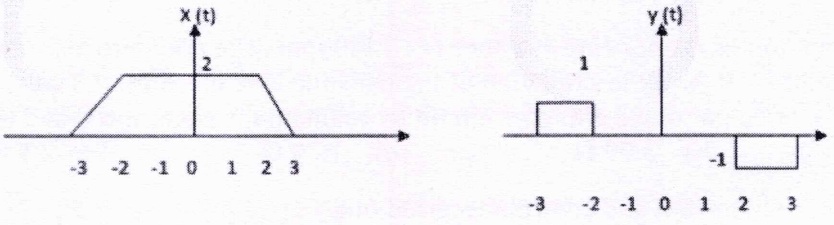
32 Determine the power of the signal: x(t) = cos(t).

a) 0.5 b) 1 c) 1.5 d) 2

33 What is the period of the following signal, $x(t) = \sin(24\pi t + 78^0)$?

a) 12 b) 24π c) 1/12 d) $1/24\pi$

34 How are x(t) and y(t) related?



a) $Y(t) = \int x(t).dt$ b) Y(t)= dx(t)/ dt c) Y(t)= x(t/2) d) Y(t)= x(t-1)

35 Determine the nature of the given system: y(t)=x(sin t).

a) Linear, causal b) Nonlinear, causal c) Linear, non-causal d) Nonlinear, non-causal

36 Find the initial value of f(t) if $F(s) = \frac{s}{(s+\alpha)^2+\omega^2}$

a) ∞ b) 0 c) 1 d) -1

37 Bandwidth of the gate function is _____.

a) τ Hz b) 2τ Hz c) 1/τ Hz d) 2/τ Hz

38 Find the Z-transform of δ(n+3)

a) 1 b) z c) z^2 d) z^3

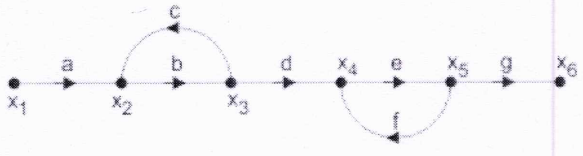
39 A power system will have greater flexibility of operation if they have _____.

a) Only Base load plants operating in combination b) Various types of power plants operating in combination c) Only Peak load plants operating in combination d) Only Thermal power plants operating in combination

40 The closed system has higher _____ than the open loop control system, this implies increased speed of response.

a) Gain b) Bandwidth c) Frequency d) Speed

41 Find the transfer function of the following system using Mason's formula:



a) adcdef/(1-(bc+ef)+bcef) b) abd/(1-(bc+ef)+bcef) c) abd/1-(ac) d) abdeg/1-(bc+ef)+bcef

42 A power system has a maximum load of 15 MW. Annual load factor is 50%. The reserve capacity of a plant in MW is _____ if the plant capacity factor is 40%.

a) 3.75 b) 7.75 c) 46.75 d) 8.75

43 Performance of short transmission lines depends on which of the following?

a) Resistance and Capacitance b) Resistance and Inductance c) Inductance and Capacitance d) Resistance, Inductance and Capacitance

44 How are sag in a span of conductor related to the span length?

a) Sag=span b) Sag $\alpha \sqrt{span}$ c) Sag= 1/span d) Sag α $span^2$

45 If the power system network is at Vs∠δ and receiving end voltage is Vr∠0 consisting of the impedance of Z_L as (R+j3) Ω. For maximum power transfer to the load, the most appropriate value of resistance R should be _____Ω.

a) 1.732 b) 3 c) 1.2 d) 0.33

46 Conductors used predominantly now in extra high voltage lines ____.

a) ACSR b) Bundled c) AAAC d) AAC

47 (I) Unsymmetrical spacing configurations cause line interference.

(II) Unsymmetrical spacing causes the voltage induction in the communication lines.

The above problems can be eliminated by _____.

a) Bundled conductors b) Transposition c) 3 phase d) Parallel lines

48 A single phase 50 hz, generator supplies an inductive load of 5 MW at a power factor of 0.8 lagging using OHTL over 20 km. The resistance and reactance are 0.39Ω and 3.96 Ω. The voltage at the receiving station is maintained at 10 KV. The sending end voltage is _____kV.

a) 11.68 b) 7.62 c) 14.4 d) 12.2

49 Homopolar link is employed instead of bipolar link to reduce _____.

a) Corona loss b) Line losses c) Voltage drops d) Radio interference

50 When _____ then the transmission line will act as a distortion less line.

a) RG=LC b) RC=LG c) $R^2 = 1/LC$ d) R=G

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