Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S,FE) (FT/WP/PT) Examination December 2025 (2019 Scheme)

Course Code: EET308

Course name: COMPREHENSIVE COURSE WORK

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.

1. Three equal resistances of 3 Ω are connected in star. What is the resistance in one of the arms in an equivalent delta circuit?

   a) 10 Ω b) 3 Ω c) 9 Ω d) 27Ω

2. Norton's equivalent circuit consists of

   a) voltage source in parallel with resistance
   b) voltage source in series with resistance
   c) current source in series with resistance
   d) current source in parallel with resistance

3. A source has an emf of 10 V and an impedance of 500 + j100 V. The amount of maximum power transferred to the load will be

   a) 0.5 mW b) 0.05 mW c) 0.05 W d) 0.5W

4. What is the phase angle between voltage and current of a series RLC circuit at resonance?

   a) zero b) 90° c) 45° d) 30°

5. The maximum possible mutual inductance of two inductively coupled coils with self-inductances L1= 5mH and L2 =100 mH is given by

   a) 25mH b) 75mH c) 500mH d) 22.36mH

6. Transient behaviour occurs in any circuit when

   a) there are sudden changes of applied voltage
   b) the voltage source is shorted
   c) the circuit is connected or disconnected from the supply
   d) all of the above happen

7. The driving-point impedance is defined as

   a) the ratio of transform voltage to transform current at the same port
   b) the ratio of transform voltage at one port to the transform current at the other port
   c) both (a) and (b)
   d) none of the above

8. A symmetrical three-phase 440 V system supplies a balanced delta-connected load. The branch current is 10 A at a phase angle of 30°, lagging. Find the total active power

a) 6.59kVAR b) 11.431kW c) 4.4kW d) 3.810kW

9. If the Z-parameters of a two-port network are Z11 =5 Ω ; Z22 = 7 Ω; Z12 = Z21 = 3 Ω then the A, B, C, D parameters are respectively given by

a) $\frac{5}{3}; \frac{26}{3}; \frac{1}{3}; \frac{7}{3}$ b) $\frac{10}{3}; \frac{52}{3}; \frac{2}{3}; \frac{26}{3}$ c) $\frac{5}{3}; \frac{1}{3}; \frac{78}{3}; \frac{23}{3}$ d) $\frac{5}{3}; \frac{11}{3}; \frac{7}{3}; \frac{2}{3}$

10. In Superposition theorem, while considering a source, all other voltage sources are?

a) short circuited b) change its position c) open circuited d) removed from the circuit

11 When voltage regulation of a transmission line is positive, the receiving end voltage is _____ the sending end voltage.

a) greater than b) equal to c) less than d) zero compared to

12 Skin effect is least significant in:

a) DC circuits b) High-frequency AC circuits c) Very long transmission lines d) Cables with large diameter

13 A suspension string have 3 units. Voltage across topmost and lower most unit of string are 6.71 volts and 11 volts respectively. What is the voltage across middle string, if voltage across whole string is 25.76 volts?

a) 83.6V b) 8.05V c) 103.47V d) 25.76V

14 The main reason SF_6 gas is used in circuit breakers is:

a) Good conductor of electricity b) High Thermal Conductivity c) Low cost d) Excellent insulating and arc-quenching property

15 Ferranti effect states that under certain conditions the sending end voltage is

a) Less that receiving end voltage b) Greater that receiving end voltage c) Less that receiving end voltage d) Abnormally high

16 A 3-phase load takes 500 kW at 0.70 lagging. PF is to be improved to 0.95 lagging using shunt capacitors. The approximate total kVAr rating of capacitor bank required is

a) 10 kVAr b) 470 kVAr c) 620 kVAr d) 345 kVAr

17 In an overcurrent relay, the operating time decreases when

a) Fault current decreases b) Fault current increases c) Pick-up current increases d) Relay burden increases

18 A directional relay requires the following two quantities to decide the direction of fault:

a) Current and b) Voltage and c) Voltage and d) Voltage and

power factor	impedance	frequency	current

19 Which power plant can handle both base load and peak load operations effectively?

a) Hydroelectric b) Thermal c) Nuclear d) Diesel

20 Two consumers have maximum demands of 5 kW and 8 kW. The combined maximum demand of the system is 10 kW. Find the diversity factor

a) 1.3 b) 1.2 c) 1 d) 2

21 In a DC machine, lap winding is generally preferred for

a) Low-current, high-voltage machines b) High-current, low-voltage machines c)) High-speed machines d) Machines where only 2 parallel paths are needed

22 Dummy coils are used in armature windings to

a) Increase EMF b) Reduce armature reaction c) Provide mechanical balance in armature d) Increase active length of conductor

23 A shunt generator fails to build up voltage if

a) Residual magnetism is lost b) Field winding is open c) Field resistance is too high d) All of the above

24 A 6-pole wave wound generator has $\Phi = 0.015$ Wb, $Z = 600$ conductors and runs at 750 rpm. Generated EMF is

a) 225 V b) 675V c) 1350 V d) 337.5 V

25 Copper losses in a DC motor vary as:

a) Voltage b) Speed c) Square of armature current d) Flux

26 Voltage regulation of a transformer is defined as the change in

a) Primary voltage from no load to full load b) Secondary voltage from full load to no load c) Efficiency under different loads d) Impedance of the transformer

27 A transformer has full-load copper loss = 800 W and core loss = 400 W. At which load will maximum efficiency occur?

a) 25% b) 70.7% c) 50% d) 100%

28 In a practical transformer, the magnetising branch is placed shunt with the primary mainly because

a) It simplifies the equivalent circuit mathematically b) The magnetising current depends on load power factor c) The magnetising current is independent of load current d) The leakage reactance must be added to this branch

29 Distribution transformer has

a) Low no-load loss b) High no-load loss c) No copper loss d) No insulation

30 Which losses can be identified from Swinburne's test?

a) No-load core loss b) Windage and friction loss c) No-load and windage and friction loss d) Stray load loss

31 The output of a NOR gate is 1 when:

a) All inputs are 1 b) All inputs are 0 c) At least one input is 1 d) Inputs are equal

32 In an SR flip-flop, S = 0 and R = 1 produces:

a) Set b) Reset c) Toggle d) Invalid

33 The simplified form of $(A + B)(A + \overline{B})$ is

a) B b) A c) AB d) Zero

34 Simplify using K-map: $F(A, B, C) = \Sigma m(1, 3, 5, 7)$

a) $A \oplus B \oplus C$ b) $B + C$ c) $\overline{A}$ d) $B\overline{C}$

35 The T flip-flop toggles when T =

a) 0 b) X c) 1 d) Depends on clock

36 A 4-bit Johnson counter has how many unique states?

a) 4 b) 2 c) 16 d) 8

37 The main problem with JK flip-flop is

a) Low speed b) Toggle condition leading to race-around c) Invalid input d) Cost

38 On adding the following binary numbers 11011 + 10001 we get

a) 101100 b) 00111 c) 011011 d) 101110

39 A 6-bit DAC with Vref = 10 V has a LSB step size equal to:

a) 0.625 V. b) 1.56 V c) 0.312 V d) 0.15625 V

40 Convert $(2F)_{16}$ into decimal

a) 45 b) 47 c) 49 d) 52

41 For an odd function, the Fourier series contains:

a) Only sine terms b) Only cosine terms c) Both sine and cosine d) No harmonics

42 Transfer function of a system is defined as the ratio of output to input in

a) Z-transform b) Fourier transform c) Laplace transform d) All of these

43 Z-transform of unit step u(n) is

a) 1 b) $\frac{1}{1-z^{-1}}$ c) $\frac{1}{1+z^{-1}}$ d) z

44 Polynomial s^3+5s^2+4s+1 is Hurwitz if

a) All coefficients > 0. b) Routh table has no sign change c) Degree 3 d) Determinant = 0

45 For $s^3+ks^2+6s+8=0$,for what value of k is system stable?

a) k>0 b) k>1.33 c) k<1.33 d) k=0

46 Mechanical translational system uses which basic elements?

a) Mass, Spring, Damper b) Inductor, Capacitor, Resistor c) Gear, Battery, Switch d) Pulley, Screw, Plate

47 The order of a system is determined by

a) Highest power of output b) Number of inputs c) Highest power of 's' in the denominator d) Number of poles

48 To increase the system type by 1, one must add

a) Zero at origin b) Pole at origin c) Pole at –1 d) Zero at –1

49 Energy of a power signal is

a) Zero b) Finite c) Infinite d) Between 1 and 2

50 A system is said to be _____ if its response is dependent upon the present and past inputs and doesn't depend upon future input

a) Casual b) Non Causal c) Time variant d) None of the above

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