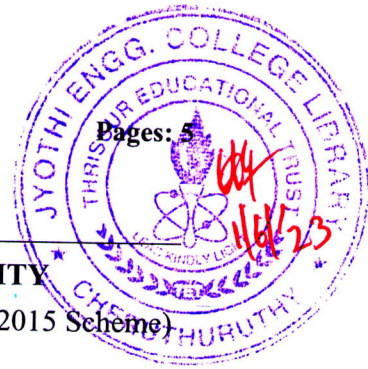


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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S6 (PT) (S, FE) Examination May 2023 (2015 Scheme)

Course Code: EC352

Course name: COMPREHENSIVE EXAM

Max. Marks: 50

Duration: 1 Hour

- 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

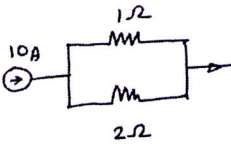
PART A- COMMON COURSES

1. The sum of the series $\frac{4}{7} + \frac{4}{7^2} + \frac{4}{7^3} + \frac{4}{7^4} + \dots$ is
a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $\frac{4}{11}$ d) $\frac{1}{7}$
2. The solution of $y'' - 4y' + 3y = 0$ is.....
a) $c_1e^{-3x} + c_2e^{-x}$ b) $c_1e^{3x} + c_2e^{-x}$ c) $c_1e^{-3x} + c_2e^x$ d) $c_1e^{3x} + c_2e^x$
3. From a circular plate of diameter 6cm is cut a circle whose diameter is a radius of the plate. Find the centre of gravity of the remainder from the centre of the circular plate
a) 0.5cm b) 1.0cm c) 1.5cm d) 2.5cm
4. The coefficient of friction depends on
a) Area of contact b) Shape of the surfaces c) Nature of the surface d) All of the above
5. A pyramid suspended from one of its base corner will have
a) its centre of gravity above corner of suspension b) its centre of gravity vertically below the corner of suspension c) its centre of gravity on the corner of suspension d) its centre of gravity at any position from the corner of suspension
6. Intersection of a cone with cylinder provides
a) straight lines b) Circles c) Curved lines d) holes
7. "The Helix of Sustainability" is a concept related to---
a) The manufacturing Industry b) The society and its environment c) The shipping Industry d) The society and Economy

8. 'Nature as a model, measure and mentor' is the concept of
- a) Co-operation between man and Nature b) Biomimicking c) Solutions for solving the problems of mankind d) None of the above.
9. One Standard used in Electrical & Electronics Engineering is.....
- a) ACI b) AISC c) IEEE d) NBC
10. is abundantly present and is the most utilized substance for the fabrication of computer chips.
- a) Silicon b) Gold c) Silver d) Copper

PART B- CORE COURSES

11. A 10 V DC source with $R_s=1 \Omega$ is connected to a load resistor. If $I_L=2 \text{ A}$, what is the value of load resistor?
- a) 3Ω b) 4Ω c) 1Ω d) 2Ω
12. Find the current through 2Ω resistor



- a) 3.33A b) 3A c) 5A d) 10A
13. What is the source impedance needed to transfer maximum power to a load impedance of $3+j4$
- a) $3-j4$ b) $3+j4$ c) 7 d) 3
14. Laplace Transform of e^{at}
- a) s b) $\frac{1}{s+a}$ c) $\frac{1}{s-a}$ d) $s-a$
15. Magnitude of network function is _____ at zeros
- a) unity b) 0 c) ∞ d) None above
16. Time constant of a RC circuit with $R=10\text{k} \Omega$ and $C=10 \mu\text{F}$ is
- a) 100ms b) 50 ms c) 100 s d) 1 ms
17. If a current $i = 3\delta(t)$ is passed through a capacitor C , what will its voltage v_c ?
- a) C b) $3C$ c) $\frac{C}{3}$ d) $\frac{3}{C}$
18. Which of the following is not a linear system?
- a) $x[n] + x[n-1]$ b) $2x_1[n] - 3x_2[n]$ c) $2x[n] + 3$ d) $5x[n]$



19. If $h(t)$ is impulse response of system and $x(t)$ is input, then output $y(t) = ?$
 a) $h(t) * x(t - t_0)$ b) $h(t) x(t)$ c) $h(t) * x(t)$ d) None above
20. $F\{e^{j\omega_0 t} f(t)\} =$
 a) $e^{j\omega} F(\omega)$ b) $F(\omega - T)$ c) $e^{j\omega t}$ d) $F(\omega - \omega_0)$
21. If f_m is the signal frequency, Nyquist frequency is
 a) $f_s \geq 2f_m$ b) $f_s \geq f_m$ c) $f_s \leq 2f_m$ d) Can be any frequency
22. Region of stability in z transforms
 a) $|z| < 1$ b) $|z| > 1$ c) $z = j$ d) $z = 1$
23. For parallelly connected systems with impulse responses $h_1[n]$ and $h_2[n]$, the overall response is
 a) $h_1[n] + h_2[n]$ b) $h_1[n] h_2[n]$ c) $h_1[n] * h_2[n]$ d) Larger of the two
24. RC integrator is a
 a) LPF b) HPF c) BPF d) BRF
25. In a series RC circuit, time constant is defined as the time taken for the capacitor to charge to
 a) 50% b) 99.99% c) 63.3% d) 10%
26. Purpose of use of emitter resistor R_E in an RC coupled amplifier is to improve
 a) gain b) stability c) bandwidth d) All above
27. Which BJT configuration has highest input impedance?
 a) CB b) CC c) CE d) CS
28. Cascode amplifier is a combination
 a) CB-CE b) CC-CE c) CE-CE d) CE-CB
29. Criteria to be satisfied for sinusoidal oscillations
 a) Barkhausen b) Kirchoff c) Negative feed back d) Wien
30. Maximum efficiency of a class B pushpull power amplifier is
 a) 50.5% b) 50% c) 78.5% d) 25%
31. % Load regulation is defined
 a) $\frac{V_L}{V_{NL}} \times 100$ b) $\frac{V_{NL} - V_L}{V_L} \times 100$ c) $\frac{V_{NL}}{V_L} \times 100$ d) None of the above
32. Hexadecimal equivalent of the binary number 10100011
 a) A4 b) A3 c) B4 d) B3
33. $A + \bar{A}B$ is
 a) A b) B c) A+B d) AB

34. Which of the following is a universal gate?
 a) AND b) OR c) X NOR d) NOR
35. Which logic circuit is faster among the following?
 a) ECL b) DTL c) TTL d) CMOS
36. A 5 bit ring counter has _____ states
 a) 5 b) 10 c) 2 d) None above
37. A mod 50 counter needs _____ flipflops
 a) 5 b) 25 c) 6 d) 50
38. If all entries in a K map is 1, then the function is $Y =$ ____
 a) 0 b) 1 c) arbitrary d) Depends on inputs
39. Human heart is an example of
 a) positive divergence b) negative divergence c) zero divergence d) infinite divergence
40. During lightening, inside of car acts as
 a) a capacitor b) a faraday cage c) an inductor d) an insulator
41. Tangential component of Electric field on a perfect electric conductor (PEC) is
 a) infinite b) half of incident c) depends on angle of incidence d) zero
42. Refractive index of light through a medium is 8, what is the relative permittivity of the medium?
 a) 4 b) 64 c) 16 d) 2.83
43. VSWR of a shorted transmission line
 a) 0 b) 1 c) 0.5 d) infinity
44. In an impedance smith chart upper half represents load.
 a) inductive b) capacitive c) reflective d) transmission
45. Possible modes of transmission in a waveguide are
 a) TE and TEM b) TE and TM c) TEM only d) TM and TEM
46. The lower frequency component in AM wave, given that carrier is 1MHz and bandwidth is 10 KHz is
 a) 10 kHz b) 1.01 MHz c) 995 kHz d) 990 kHz
47. Intermediate frequency of AM receiver is
 a) 91.9 M Hz b) 455 kHz c) 102.3 M Hz d) 625 kHz
48. White noise is a random signal having constant
 a) noise amplitude b) power spectral density c) Both a and b d) None of the above

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49. Which of the following schemes are **not** preferred for good quality music transmission?
- a) FM b) SSB c) AM d) none of the above
50. Pre emphasis helps to boost
- a) low frequency signals b) audio signals c) high frequency signals d) band pass signals
