ECAT

Engineering College Admission Test

COMPUTER SCIENCE TRACK

100 Solved MCQs — Authentic Answer Distribution

100	400	100	-1
Questions	Total Marks	Minutes	Negative Mark

SUBJECT BREAKDOWN

Mathematics	Physics	Computer Science	English
30 MCQs	30 MCQs	30 MCQs	10 MCQs

INSTRUCTIONS & ANSWER KEY LEGEND

Each correct answer = +4 marks | Each wrong answer = -1 mark | Unattempted = 0

Total time: 100 minutes | 100 MCQs with 4 options each (A, B, C, D)

Correct answers: GREEN background + GREEN circle + (v) checkmark

Wrong options: Light grey background with letter badge

Answer distribution: A=29 B=28 C=22 D=21 (realistic, no exploitable pattern)

MATHEMATICS

Q1 - Q30

30 x 4 = 120 marks

Q1 If f(x)=x^3-6x^2+9x+1, the local maximum occurs at x=?

- A v x = 1
- B x = 3
- C x = 0
- D x = 2

Q2 Value of the definite integral of sin(x) from 0 to pi:

- A 0
- B v 2
- C 1
- D pi

Q3 Correct expansion of (a + b)^3:

- A a^3+b^3
- B 3a^2b+3ab^2
- C v a^3+3a^2b+3ab^2+b^3
- D a^3-b^3

Q4 The eccentricity of a circle is always:

- A Greater than 1
- B Equal to 1
- C Between 0 and 1
- D v Equal to 0

Q5 If tan(t)=4/3, t in first quadrant, then sin(t)=?

- A v 4/5
- B 3/5
- C 4/3
- D 3/4

Q6 Matrix product AB is defined when columns of A = _____ of B:

- A Columns
- B v Rows
- C Elements
- D Diagonals

Q7 Sum of infinite series 1+1/3+1/9+1/27+... equals:

- A 1
- B 2
- C ✓ 3/2
- D 3

Q8 Parabola with vertex at origin opening rightward:

- A ✓ y^2=4ax
- B x^2=4ay
- C y^2=-4ax
- D x^2=-4ay

Q9 sin^2(t)+cos^2(t) always equals:

- A sin(2t)
- B 0
- C 2
- D ✓ 1

Q10 Integral of (1/x)dx equals:

- A x^(-2)+C
- B ✓ ln|x|+C
- C 1/x^2+C
- D e^x+C

Q11 Number of diagonals in a hexagon is:

- A 6
- B 12
- C ✓ 9
- D 15

Q12 If f(x)=2x-5, then inverse f^(-1)(x)=?

- A ✓ (x+5)/2
- B (x-5)/2
- C 2x+5
- D x/2-5

Q13 Slope of line perpendicular to y=3x+5 is:

- A 3
- B 1/3
- C 1
- D ✓ -1/3

Q14 Which is the correct compound angle identity?

- A ✓ sin(A+B)=sinA*cosB+cosA*sinB
- B sin(A+B)=sinA*sinB
- C cos(A+B)=cosA*sinB
- D tan(A+B)=tanA+tanB

Q15 Determinant of an identity matrix of any order is:

- A 0
- B ✓ 1
- C n
- D -1

Q16 Domain of f(x)=sqrt(x-4) is:

- A x>4
- B All reals
- C ✓ x>=4
- D x<=4

Q17 P(A)=0.3, P(B)=0.4, A & B mutually exclusive. P(A or B)=?

- A ✓ 0.7
- B 0.12
- C 0.1
- D 1.0

Q18 Value of log base 10 of 1000 is:

- A 10
- B 100
- C 1/3
- D ✓ 3

Q19 a=2i-j+3k, b=i+2j-k. Dot product a.b=?

- A 7
- B ✓ -3
- C 3
- D -7

Q20 Second derivative of f(x)=sin(x) is:

- A cos(x)
- B -cos(x)
- C ✓ -sin(x)
- D sin(x)

Q21 Number of ways to arrange 4 distinct books on a shelf:

- A ✓ 24
- B 12
- C 16
- D 4

Q22 Vertex of parabola y=x^2-4x+7 is:

- A (-2,3)
- B ✓ (2,3)
- C (2,-3)
- D (4,7)

Q23 Integral of e^(2x) dx equals:

- A 2e^(2x)+C
- B e^(2x)/x+C
- C e^x+C
- D ✓ (1/2)e^(2x)+C

Q24 Remainder when x^3-2x+5 is divided by (x-1):

- A 0
- B 6
- C ✓ 4
- D -1

Q25 In right triangle, 30 degrees angle: opposite/hypotenuse=?

- A ✓ 1/2
- B sqrt(3)/2
- C 1/sqrt(2)
- D sqrt(3)

Q26 Range of f(x)=x^2 for x in all reals is:

- A (-inf,+inf)
- B ✓ [0,+inf)
- C (0,+inf)
- D [-1,1]

Q27 If roots of ax^2+bx+c=0 are equal, discriminant b^2-4ac=?

- A b^2
- B 4ac
- C 1
- D ✓ 0

Q28 Value of 8C3 (8 choose 3) is:

- A 28
- B 70
- C v 56
- D 24

Q29 Which conic section has eccentricity greater than 1?

- A v Hyperbola
- B Ellipse
- C Parabola
- D Circle

Q30 Angle between lines with direction ratios (1,1,0) and (1,-1,0):

- A 45 deg
- B v 90 deg
- C 60 deg
- D 30 deg

PHYSICS

Q31 - Q60

30 x 4 = 120 marks

Q31 Total electric flux through closed surface = charge/epsilon_0 is:

- A Faraday's Law
- B Ampere's Law
- C v Gauss's Law
- D Coulomb's Law

Q32 Body thrown up at 20 m/s (g=10). Time to reach top:

- A v 2 s
- B 4 s
- C 1 s
- D 10 s

Q33 Which quantity is a SCALAR?

- A Electric field
- B v Electric potential
- C Magnetic force
- D Velocity

Q34 Total internal reflection occurs when light goes from:

- A Rarer to denser
- B Vacuum to glass
- C Air to water
- D v **Denser to rarer at/beyond critical angle**

Q35 SI unit of electric field strength:

- A v **N/C (or V/m)**
- B C/N
- C V*m
- D C*m

Q36 Force per unit length on current-carrying wire in field B:

- A F/L=BI*cos(t)
- B F/L=B/I
- C v **F/L=BI*sin(t)**
- D F/L=I/B

Q37 Escape velocity from Earth's surface is approximately:

- A 7.9 km/s
- B v **11.2 km/s**
- C 9.8 km/s
- D 3x10^8 m/s

Q38 Principle that explains airplane wing lift:

- A v **Bernoulli's Principle**
- B Archimedes' Principle
- C Pascal's Principle
- D Newton's 3rd Law

Q39 RMS speed of gas molecules is proportional to:

- A T
- B T^2
- C 1/T
- D v **sqrt(T)**

Q40 Electromagnetic radiation with HIGHEST frequency:

- A X-rays
- B Ultraviolet
- C v **Gamma rays**
- D Radio waves

Q41 Entropy measures a system's:

- A Temperature
- B ✓ Disorder (randomness)
- C Pressure
- D Internal energy

Q42 Coefficient of restitution for perfectly elastic collision:

- A ✓ 1
- B 0
- C 0.5
- D Infinity

Q43 Pitch=1mm, 50 circular divisions. Least count of screw gauge:

- A 0.05mm
- B 0.01mm
- C 0.1mm
- D ✓ 0.02mm

Q44 Which is a NON-INERTIAL frame of reference?

- A ✓ An accelerating car
- B Train at constant speed
- C Stationary room
- D Freely falling lift

Q45 SI unit of magnetic flux:

- A Tesla (T)
- B ✓ Weber (Wb)
- C Henry (H)
- D Ampere (A)

Q46 Work done moving charge in closed loop in static E field:

- A Maximum
- B Path-dependent
- C ✓ Zero
- D Minimum

Q47 In beta-minus decay, atomic number Z:

- A ✓ Increases by 1
- B Decreases by 1
- C Stays same
- D Decreases by 2

Q48 Two capacitors C each in PARALLEL give total capacitance:

- A C/2
- B C
- C 4C
- D ✓ 2C

Q49 A convex (diverging) mirror ALWAYS produces image that is:

- A Real, inverted, enlarged
- B ✓ Virtual, erect, diminished
- C Virtual, inverted, magnified
- D Real, erect, same size

Q50 Polarization proves light is a _____ wave:

- A Longitudinal
- B Mechanical
- C ✓ Transverse
- D Sound

Q51 Binding energy per nucleon is MAXIMUM for:

- A ✓ Iron (Fe-56)
- B Hydrogen
- C Uranium
- D Helium

Q52 Young's modulus is the ratio of:

- A Strain to Stress
- B ✓ Stress to Strain
- C Force to Volume
- D Pressure to Area

Q53 Doppler effect occurs due to:

- A Wave reflection
- B Constructive interference
- C Wave refraction
- D ✓ Relative motion: source & observer

Q54 Logic gate that outputs 1 ONLY when ALL inputs are 0:

- A NAND
- B OR
- C ✓ NOR
- D AND

Q55 Angle of contact for mercury with glass is approximately:

- A v 135 degrees
- B 0 degrees
- C 90 degrees
- D 45 degrees

Q56 Surface tension arises from:

- A Adhesive forces
- B v Cohesive forces between molecules
- C Gravity on surface
- D Atmospheric pressure

Q57 Period of satellite orbiting close to Earth's surface:

- A 24 hours
- B 60 minutes
- C 12 hours
- D v 84 minutes

Q58 Depletion region in p-n junction forms by:

- A v Recombination of electrons & holes
- B Only holes moving
- C Only electrons moving
- D External voltage

Q59 At critical temperature, superconductor's electrical resistance:

- A Is maximum
- B v Becomes zero
- C Stays unchanged
- D Doubles

Q60 Photon wavelength 6000 Angstrom. Energy approx (h=6.6x10^-34):

- A 6.6x10^-19 J
- B v 3.3x10^-19 J
- C 1.6x10^-19 J
- D 6.6x10^-34 J

COMPUTER SCIENCE

Q61 - Q90

30 x 4 = 120 marks

Q61 **ASCII stands for:**

- A ✓ **American Standard Code for Information Interchange**
- B Automated System Code for Information
- C American Software Code for Integration
- D Advanced Standard Code for Interface

Q62 **Which is NOT a feature of OOP?**

- A Encapsulation
- B Inheritance
- C ✓ **Goto statements**
- D Polymorphism

Q63 **Default access specifier for CLASS members in C++:**

- A public
- B ✓ **private**
- C protected
- D none

Q64 **Octal equivalent of decimal 64 is:**

- A 40
- B 80
- C 144
- D ✓ **100**

Q65 **SQL aggregate function that counts total rows:**

- A ✓ **COUNT()**
- B SUM()
- C AVG()
- D MAX()

Q66 **Stack data structure follows which removal order?**

- A FIFO
- B Random access
- C ✓ **LIFO (Last In First Out)**
- D LILO

Q67 **In C++, operator to access members via POINTER to object:**

- A .
- B ✓ **->**
- C ::
- D []

Q68 HTML stands for:

- A ✓ HyperText Markup Language
- B High-Tech Markup Language
- C HyperText Management Language
- D HyperTransfer Markup Language

Q69 Virtual functions in C++ achieve:

- A Encapsulation
- B Data hiding
- C Compile-time polymorphism
- D ✓ Runtime polymorphism

Q70 Binary addition: 1101 + 0110 = ?

- A 1011
- B 10111
- C ✓ 10011
- D 1001

Q71 Which memory is NON-VOLATILE?

- A RAM
- B ✓ ROM
- C Cache
- D Register

Q72 A FOREIGN KEY in a relational database references:

- A ✓ Primary key of another table
- B Any column, same table
- C Index of different database
- D NULL value in column

Q73 Worst-case time complexity of Bubble Sort:

- A O(n log n)
- B O(n)
- C O(log n)
- D ✓ O(n^2)

Q74 HTTP protocol operates at which OSI layer?

- A Transport Layer (4)
- B Network Layer (3)
- C ✓ Application Layer (7)
- D Physical Layer (1)

Q75 In C++, a destructor is called:

- A When program starts
- B ✓ When object goes out of scope/deleted
- C When a function is called
- D When object is created

Q76 Which is a valid IPv4 address?

- A ✓ 192.168.1.100
- B 256.1.1.1
- C 192.168.1.300
- D 192.168.1

Q77 Queue data structure uses which order?

- A LIFO
- B FILO
- C Random access
- D ✓ FIFO (First In First Out)

Q78 1's complement of binary 1010:

- A 1011
- B 0110
- C ✓ 0101
- D 0100

Q79 Keyword in C++ to prevent class from being inherited:

- A sealed
- B ✓ final
- C static
- D const

Q80 In MS Access, which object retrieves specific records?

- A ✓ Query
- B Form
- C Report
- D Macro

Q81 URL stands for:

- A Universal Resource Link
- B Uniform Reference Locator
- C United Resource Language
- D ✓ Uniform Resource Locator

Q82 Data structure used to implement function call stack:

- A Queue
- B Linked List
- C ✓ Stack
- D Tree

Q83 C++ templates are used to create:

- A ✓ Generic functions and classes
- B Virtual functions
- C Recursive algorithms
- D Database connections

Q84 Relationship where one record links to many records:

- A Many-to-Many
- B ✓ One-to-Many
- C One-to-One
- D Self-referencing

Q85 Converting source code to machine code is called:

- A Linking
- B Loading
- C Interpretation
- D ✓ Compilation

Q86 C++ header file needed for cin and cout:

- A <stdio.h>
- B <conio.h>
- C ✓ <iostream>
- D <stdlib.h>

Q87 A ROUTER operates primarily at which OSI layer?

- A ✓ Network Layer (3)
- B Data Link Layer (2)
- C Physical Layer (1)
- D Transport Layer (4)

Q88 Hexadecimal A3 converted to decimal:

- A 143
- B ✓ 163
- C 173
- D 183

Q89 **Base class pointer calling derived class method uses:**

- A Overloading
- B Templates
- C Friend functions
- D v **Virtual functions**

Q90 **2's complement of binary 0110:**

- A 1001
- B v **1010**
- C 1011
- D 0110

ENGLISH

Q91 - Q100

10 x 4 = 40 marks

Q91 **Complete: Despite the rain, the match _____ as scheduled.**

- A was proceeded
- B v **proceeded**
- C had proceeded
- D proceeding

Q92 **'Benevolent' means:**

- A v **Kind and generous**
- B Cruel and selfish
- C Brave and fearless
- D Lazy and careless

Q93 **Identify the CORRECT sentence:**

- A Each student have submitted.
- B v **Each of the students has submitted the assignment.**
- C Each of the students have submitted.
- D Each of them are submitting.

Q94 **Antonym of 'Verbose' is:**

- A Wordy
- B Talkative
- C Detailed
- D v **Concise**

Q95 Which uses PAST PERFECT tense correctly?

- A ✓ He had finished before the bell rang.
- B He has finished before the bell rang.
- C He finished before the bell will ring.
- D He was finishing before the bell rang.

Q96 Correct form: The committee _____ its decision tomorrow.

- A announces tomorrow
- B ✓ will announce
- C will announced
- D had announced

Q97 Figure of speech in 'The wind whispered through the trees':

- A Simile
- B Metaphor
- C ✓ Personification
- D Hyperbole

Q98 'Laconic' means:

- A Speaking at great length
- B Being very emotional
- C Writing extensively
- D ✓ Using very few words

Q99 Choose correctly spelled word:

- A Accomodate
- B ✓ Accommodate
- C Acommodate
- D Accomadate

Q100 In comprehension, to 'infer' means to:

- A ✓ Draw conclusion not directly stated
- B Copy word for word
- C Disagree with author
- D Summarize only main idea