

UNIVERSITY OF ENGINEERING AND TECHNOLOGY, LAHORE

ENTRANCE TEST – 2014
For F.Sc and Non-F.Sc. Students
Time Allowed: 100 Minutes Total
MCQs: 100

Instructions:

- (i) Read the instruction on the MCQ Response Form carefully.
- (ii) Choose the single best answer for each question.
- (iii) Candidates are strictly prohibited from giving any identification mark except Roll No. & Signature in the specific columns only.

COMPULSORY QUESTION FOR IDENTIFICATION

Q-ID What is the color of your question Paper?

- A) BLUE
- B) GREEN
- C) RED
- D) YELLOW

Ans: Color of your question Paper is green. Fill the corresponding to letter 'B' Against 'ID' in your MCQ (Exactly as shown in the Diagram).

	A	B	C	D
-ID	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
-1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

circle response form

PHYSICS

1. A 500kg rocket travels in deep space of a constant speed of 300m/s. The power being produced by the rocket engine at this time:
 - A) 1500 kw
 - B) 0.16 kw
 - C) 6 kw
 - D) None of these
2. A shell is fired at an angle of 45 degree above ground with an initial velocity of 100 m/sec. It will hit the ground assuming "g" 10 m/sec² after about:
 - A) 7 seconds
 - B) 10 seconds
 - C) 14 seconds
 - D) 20 seconds
3. Find the average speed of a car whose velocity – time graph is shown in the figure:
 - A) 17.5 m/sec
 - B) 20 m/sec
4. A girl stands on a weighing scale placed in a stationary lift (elevator). The scale reads 30kg. The lift is then activated to move from ground floor to 10th floor. As the lift moves from its stationary position on the ground floor until it comes to rest on the 10th floor, the scale reading will:
 - A) Remain constant
 - B) First decrease, becomes for some time, and then increase
 - C) First increase, becomes constant for some time
 - D) First increase, become constant for some time and then decrease
5. A 1000 kg truck pulls a 500 kg car by means of a rope with a speed of 10 m/sec. The rope suddenly breaks causing the truck to move forward with a speed of 13 m/sec. Find the speed of the car after the rope breaks:
 - A) 12 m/sec in the same direction
 - B) 4 m/sec in the opposite direction as that of truck
 - C) Zero m/sec
 - D) 4 m/sec in the same direction as that of the truck
6. In an elastic collision between two bodies, the following is conserved:
 - A) Kinetic energy
 - B) Kinetic energy and momentum
 - C) Momentum duty
 - D) Total energy and momentum
7. As the water falls from a top, its cross sectional are should decrease according to:
 - A) Bernoulli equation
 - B) Venturi relation
 - C) Continuity equation
 - D) None of the above
8. A 100 kg satellite 400 km above earth has an orbital speed of v km/hour. A 200 kg satellite with the same orbit radius will require an orbital speed:
 - A) v km/hour
 - B) 2v km/hour
 - C) $v\sqrt{2}$ km/hour
 - D) $\sqrt{2}v$ km/hour
9. The phenomenon if interference occurs in:
 - A) Sounds wave only
 - B) Visible light only
 - C) All types of waves
 - D) Radio wave only
10. The density of oxygen is about 16 times that of the hydrogen. Therefore if speed of sound in oxygen is x, its speed in hydrogen will be:
 - A) Greater than x
 - B) The siren not be heard by the car

- C) 2KHz
D) Less than 2KHz
11. A police motor cycle running at 130 km/h sounds a siren of 2 KHz frequency while a car running at 150 km/h. The apparent frequency of the siren heard by the car driver will be:
A) Greater than 2 KHz
B) The siren will not be heard by the car
C) 2 KHz
D) Less than 2 KHz
12. Young's double slit experiment is used to study interference of:
A) Microwaves
B) Radiowaves
C) Sounds waves
D) Visible light
13. You have 10 resistors available each of 20 K Ω . You need to form a 2.5 K Ω resistor for your circuit using the available resistors. You can connect:
A) Eight 20 Ω in series
B) Four 20 Ω in series
C) Eight 20 Ω in parallel
D) None of above
14. You have 15 capacitors available with you, each of 15nF. You need a capacitance of around 150nF in a circuit. You can achieve this value by connecting.
A) 10 capacitors in series
B) 10 capacitors in parallel
C) 12 capacitors in series
D) 8 capacitors in parallel
15. Current through a 2mH inductor is $i(L) = 2\sin 100t$ Amps. The voltage across the inductor will be:
A) 400 mv
B) 4 cos 100r mv
C) 400 cos 100r mv
D) 4s in 1000r mv
16. The following device does not use electromagnetic waves for its operation:
A) Ultra-sound machine
B) X-rays machine
C) Radar
D) Mobile phone
17. A transistor cannot be used as a:
A) Switch
B) Amplifier
C) Power source
D) Inverter
18. A 1000 kg truck carrying a load of 500 kg travels on a mountain road for minute at constant speed. If power output is 2500 watts. Assuming $g = 10\text{m/sec}^2$, it will achieve a vertical height of:
A) 75m
B) 50m
C) 1.2m
D) 100m
19. A thermistor with positive temperature coefficient is used to measure temperature in an oven. When temperature of the oven increases, the resistance value of thermistor:
A) Decreases
B) Remains unchanged
C) Increases
D) None of the above
20. When a metal surface is escaped to light it may emit electrons. The maximum energy of these electrons depends on:
A) Intensity of light
B) Wavelength of light
C) Area of metal surface
D) All of the above
21. The truth table shown in figure is implemented by:
- | A | B | G |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | G |
- A) NOR gate
B) AND gate
C) OR gate
D) XOR gate
22. Reception of a particular radio station is selected by tuning the tuning knob of a radio. Tuning the tuning knob changes the:
A) Inductance of the tuning circuit
B) Resistance of the tuning circuit
C) Capacitance of the tuning circuit
D) None of above
23. AC voltage is fed into a single diode rectifier. The output of the rectifier is:
A) Full wave rectified DC voltage
B) Double frequency AC voltage
C) Half wave rectified DC voltage
D) Nothing
24. In frequency modulation, the amplitude of the carrier waves remains the same but its frequency changes in proportion to:
A) The amplitude of the modulating signal
B) The frequency of the modulating signal
C) The sign of the modulating signal
D) All of the above
25. An AC generator produces alternating voltage of x volts rms. The peak value of this alternating voltage is:
A) $1.414x$ volts
B) $\frac{x}{\sqrt{2}}$ volts
C) $\frac{x}{2}$ volts
D) $x\sqrt{2}$

26. An transformer has 100 turns on the input side and 500 turns on the output side. If the rms values of the input voltage and current are 200 v and 2A respectively, then the output power is about:
A) 480watts
B) 1440 watts
C) 440 watts
D) 90 watts
27. According to Heisenberg's uncertainly principle, for any given particle it is not possible to accurately measure :
A) Both position and momentum
B)Its momentum
C) Its position
D)Its velocity
28. One of the environment friendly means of generating circuit power is from Bio-gas. Bio-gas is?
A) Available naturally in oil reserve
B) Available in rivers
C) Not a gas
D) Produce from cattle gas
29. Two blocks of iron are heated to 200°C and 400°C respectively. Compared to the 200°C blocks, the 400°C block will emit radiation of:
A) Same wavelength
B) Smaller wavelength
C) Larger wavelength
D) Lower frequency
30. When you drop a ball it accelerates downwards at 9.8 m/sec². If you instead throw it downward, then its accelerating immediately after leaving your hand, assuming no air resistance is:
A) 9.8 m/sec²
B) Less than 9.8 m/sec²
C) More than 9.8 m/sec²
D) Depends on throwing speed



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MATHEMATICS

31. The value of x that satisfies $(x+5)^2 = 2$:
- A) $\frac{-5+\sqrt{425}}{2}$ B) $\frac{-5-\sqrt{425}}{2}$
 C) $\frac{-5+\sqrt{425}}{2}$ D) $\frac{-5+\sqrt{425}}{2}$
32. The acute angle x radians is such that $\tan(x) = K$ where K is a positive constant.
- A) K B) $-K$
 C) $\frac{K}{\sqrt{K^2+1}}$ D) $\frac{1}{K}$
33. The solution to $(x-2) < (3-2x)$ is:
- A) $1 < x < \frac{5}{3}$ B) $x < 1$
 C) $x < 1$ D) $x < \frac{5}{3}$
34. The gradient of the curve $Y = \frac{12}{(x^2-4x)}$ as $x = 3$ is:
- A) -6 B) -4
 C) -24 D) $-\frac{8}{3}$
35. The integral $\int_0^1 (4x-3)dx$ evaluates:
- A) -1 B) 2
 C) $-\frac{1}{2}$ D) 0
36. The function f and B are defined by $fx \rightarrow 3x+2$, $fx \rightarrow \frac{5(2-x+3)}$. The solution of $f^{-1}(x)$ is:
- A) -2 or $9\frac{2}{5}$ B) -2 or $9\frac{2}{5}$
 C) $-\frac{5}{4}$ or $\frac{5}{4}$ D) $-\frac{4}{5}$ or $\frac{4}{5}$
37. The curve has equation $Y = \frac{k}{x}$ if the gradient of the curve is -3 when $x = 2$ then K is:
- A) 3^4 B) -6
 C) 12 D) -12
38. An arithmetic progression has a first term of 12 and a fifth term of $1/$. The sum of the first 25 terms is:
- A) 400 B) 350
 C) 750 D) 150
39. The first three terms in a geometric progression are 144 , x and 64 respectively. Where x is positive. The sum to infinity of the progression is:
- A) 48 B) 96
 C) 216 D) 432
40. If $2 \sin(x)$, $\tan(x) = 3$ for $0^\circ \leq x \leq 360^\circ$ then x is:
- A) 45° or 315° B) 30° or 330°
 C) 60° or 300° D) None of the above
41. A curve is such that $\frac{dy}{dx} = 2x^2 - 5$. If $(3,8)$ lies on the curve then the equation of the curve is:
- A) $\left(\frac{2}{3}\right)x^3 - 5x + 8$ B) $\left(\frac{2}{3}\right)x^2 - 5x + 11$
 C) $\left(\frac{2}{3}\right)x^2 - 5x + 3$ D) $\left(\frac{2}{3}\right)x^2 - 5x + 5$
42. The function f and g are defined by $f : x \rightarrow 2x - a$, $x \in x_a$ is a constant $g : x \rightarrow x^2 - 6$ $x \in R$. The value of a for which $f(x) = g(x)$ has exactly one real solution:
- A) 7 B) 0
 C) 16 D) 12
43. The real roots of $\left(\frac{18}{x^4}\right) + \left(\frac{1}{x^2}\right) = 4$ are:
- A) $-2^{\frac{3}{2}}$ and $2^{\frac{3}{2}}$ B) $-2^{\frac{3}{2}}$ and $3^{\frac{3}{2}}$
 C) $-3^{\frac{3}{2}}$ and $3^{\frac{3}{2}}$ D) $2^{\frac{3}{2}}$ and $-3^{\frac{3}{2}}$
44. The function f and g are defined by:
- $f : x \rightarrow 3x + 2, x \in x$ $g : x \rightarrow \frac{6}{(2x+3)}, x \in x_a - \frac{3}{2}$

The value of x for which $f g(x) = 3$:

- A) ~~56~~ B) 15
C) 7.5 D) ~~65~~

45. The matrix $A = \begin{bmatrix} 1 & 0 \\ 0 & P \end{bmatrix}$ and $A + A^{-1} = KI$ then the value of constant P and R is

- A) +1 and +2 B) -1 and +12
C) +1 and +2 D) 1 and ~~12~~

46. The determinant of $A = \begin{bmatrix} 1 & -3 & -6 \\ 0 & 4 & -3 \\ 0 & +3 & 4 \end{bmatrix}$:

- A) 16 - 9/ B) 16 + 9/
C) -24 D) 25

47. If $(2x+1)(2x-1) = (2x+1)(4x^2 - 1)$ for all values of x , then the value of n is:

- A) 1 B) 3
C) 4 D) 4

48. The expression $x \frac{(n-1)(n-2)t}{n^2}$ reduces to:

- A) $1/(n(n-1))$ B) $1/(n^2 - n^2)$

49. Using binomial theorem, $(2.02)^2$ approximates up to two decimal places to:

- A) 16.40 B) 16.44
C) 16.40 D) 16.60

50. The identity $\frac{1+\cos x}{\sin x} + \frac{\sin x}{1+\cos x}$ equals:

- A) $2 \cot x$ B) $2 \tan x$
C) $2 \sin x$ D) $1 \tan x$

51. Given $x = \cos \theta$, $\sin \theta$ equals:

- A) $1 + x^2$ B) $\pm \sqrt{1 - x^2}$
C) $1 - x^2$ D) $1/x$

52. The function $y = -3 + 3x - x^2$ for $x > 0$ has a maximum value at:

- A) (1, 5) B) (5, 1)
C) (3, 4) D) (2, 2)

53. The determinant of the matrix

- A) -1, 4 B) 0, 1
C) 3, -3 D) 1, -4

54. Given that $s = \begin{bmatrix} 81 & 0 \\ 0 & 81 \end{bmatrix}$ then s^{-4} is given by:

- A) $\begin{bmatrix} 81 & 0 \\ 0 & 81 \end{bmatrix}$ B) $\begin{bmatrix} 0 & 81 \\ 81 & 0 \end{bmatrix}$
C) $\begin{bmatrix} 27 & 0 \\ 0 & 27 \end{bmatrix}$ D) $\begin{bmatrix} 0 & 27 \\ 27 & 0 \end{bmatrix}$

55. Solve for x if $x^{t-3} / 8^{-4} = x^{t/2}$:

- A) ~~58~~ B) -58
C) ~~85~~ D) -85

56. If $n > 0$ and $4x^2 + kx + 25 = (2x + n)^2$ for all values of x , then the value of $(k - n)$ is:

- A) 6 B) 5
C) 12 D) 0

57. The range of values of m for which the roots of the equation $mx^2 + 1 = x(x + 3)$ are not real is:

- A) $m > 134$ B) $m < 134$
C) $m > -134$ D) $m < -134$

58. The solution set of equations $2x - 2y = 1$ and $x - y = 6$ is:

- A) {} B) {1, 1}
C) {2, 3} D) {0}

59. The solution of $\sqrt{y+3} = \sqrt{3y-5}$ is:

- A) 2 B) 4

60. The solution set of $2y+5 > 4y-3$ is:
- C) 1
 - A) $y > 4$
 - C) $y < 8$
 - D) -4
 - B) $y > 8$
 - D) $y < 4$



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CHEMISTRY

61. **More than one crystalline form of an element:**
 A) Isomorph B) Polymorph
 C) Allotropy D) None
62. **In an alkaline battery the anode the cathode and electrolyte are respectively.**
 A) Zinc, manganese dioxide, potassium hydroxide
 B) Zinc, manganese dioxide, Sodium hydrogen
 C) Zinc, manganese dioxide, potassium hydroxide
 D) Manganese dioxide, Zinc, potassium hydroxide
63. **Lead acid batteries discharge with time because of:**
 A) Deposition of PbSO₄ at anode B) Deposition of PbSO₄ at cathode
 C) Both A and B D) Acid neutralization with time
64. **The smallest part of a crystal lattice is:**
 A) An atom B) An ion
 C) A unit cell D) An element
65. **A crystal system in which all axis are equal, but non of the angel is 90° is:**
 A) Cubic B) Orthorhombic
 C) Monoclinic D) Rhombohedral
66. **Fast neutron has an energy of:**
 A) 1 Mev B) 1.1 ev
 C) 12 ev D) 1.2 Mev
67. **Which of the electronic configuration of nitrogen is correct?**
 A) 1s²; 2s²; 2p³; 2p² B) 1s²; 2s²; 2p³; 2p²; 2p¹
68. **Which of the electronic configuration represents an element that forms a simple ion with charge of 2+**
 A) 1s²; 2s²; 2p⁶; 3s²; 3p⁶ B) 1s²; 2s²; 2p⁶; 3s²; 3p⁶; 3d¹; 4s²
 C) 1s²; 2s²; 2p²; 3s²; 3p¹ D) 1s²; 2s²; 2p¹; 3s²; 3p⁶; 3d¹; 4s²
69. **Balance the following reaction :**
 A) 4H₃BO₃+2Na(OH) → Na₂B₄O₃+7H₂O
 B) 4H₃BO₄+Na(OH) → Na₂B₄O₃+7H₂O+4H₂O
 C) 2H₃BO₃+4Na(OH) → 2Na₂B₄O₃+7H₂O+5H₂O
 D) 3H₃BO₃+2Na(OH) → Na₂B₄O₃+7H₂O+H₂O
70. **To ensure that ethanol is not used for drinking purposes, it is converted to methylated spirit by adding:**
 A) 10% methanol and a little acetone B) 50% alcohol
 C) 10% Petrol and little diese l D) Only 10% acetone
71. **Pickle (achar in urdu) when placed in the path of current:**
 A) Will conduct current B) Will not conduct current
 C) Will not conduct current D) None of the above
72. **Steel is manufactured by open health process from:**
 A) Wrought iron B) Cast iron
 C) Steel scrap D) All of the above
73. **Steel is an alloy of iron containing 0.25% to 2.5% of carbon and traces of other metals. It is further classified as:**
 A) Mild Steel B) Medium Carbon Steel
 C) High carbon steel D) All of the above
74. **Which of the following ions has more electrons than protons and more protons than neutron? (Hint H=1):**
 A) D⁺ B) D₂O⁺
 C) He⁺ D) OH⁻
75. **Which of the following is not used as a fertilizer?**
 A) Ozone B) Chlorine dioxide
 C) Chlorine D) All of the above
76. **Which of the following is not used to disinfect water?**
 A) Anhydrous ammonia B) Ammonium hydroxide
 C) Calcium nitrate D) Diammonium phosphate
77. **Poly (tetra fluoroethene) is a polymer used as a coating in none-stick kitchen utensils and for replacement bone joints one of the stages in the manufacture of polymer is:**

$$2\text{HClF}_3(\text{g}) = \text{C}_2\text{F}_4(\text{g}) + 2\text{HCl}(\text{g}), \Delta\text{H} = +125\text{K/mol-1}$$
Which of the following conditions will shift this equilibrium to the right?
 A) High temperature B) High pressure
 C) Using a catalyst D) All of the above
78. **The following is an example of polymers:**
 A) Rubber B) Proteins
 C) Using a catalyst D) All of the above

79. Acetaldehyde can be prepared by oxidizing:
 A) Methyl alcohol
 B) Ethyl alcohol
 C) Acetone
 D) All of the above
80. Balance the following reaction:

$$\text{KCrO}_2 + \text{Br}_2 + \text{KOH} \longrightarrow \text{K}_2\text{CrO}_4 + \text{KBr} + \text{H}_2\text{O}$$
 A) $2\text{KCrO}_2 + \text{Br}_2 + 2\text{KOH} \longrightarrow 4\text{K}_2\text{CrO}_4 + 2\text{KBr} + \text{H}_2\text{O}$
 B) $2\text{KCrO}_2 + 2\text{Br}_2 + 4\text{KOH} \longrightarrow \text{K}_2\text{CrO}_4 + 4\text{KBr} + 4\text{H}_2\text{O}$
 C) $2\text{KCrO}_2 + 3\text{Br}_2 + 8\text{KOH} \longrightarrow 2\text{K}_2\text{CrO}_4 + 6\text{KBr} + 4\text{H}_2\text{O}$
 D) $2\text{KCrO}_2 + 3\text{Br}_2 + 6\text{KOH} \longrightarrow 2\text{K}_2\text{CrO}_4 + \text{KBr} + 6\text{H}_2\text{O}$
81. Ethanol can be prepared by treating the following in the presence of enzymes.
 A) Protein
 B) Starch
 C) Oil
 D) None of the above
82. The periodic table provides a basic framework to study the periodic behavior of the physical and chemical properties of the:
 A) Elements only
 B) Compounds only
 C) Elements and their
 D) Elements and their in organic compounds only
83. The oxidation states of boron are:
 A) +1, +2 and +3
 B) +1, -2 and -3
 C) +1 and -1
 D) +3 and -1
84. The atomic masses of sodium and chlorine are 23 and 35, respectively. 29 grams of sodium chloride is equivalent to:
 A) 0.5 moles
 B) 0.2 moles
 C) 2 mole
 D) 0.05
85. Potassium permanganate reacts with hydrogen sulphide (H₂S) to produce:
 A) Oxygen
 B) Sulphur dioxide
 C) Sulphur
 D) Sulphuric acid
86. A freshly prepared aqueous solution of volume 1 dm³ contained 0.4 moles of reactant A and 0.5 moles of reactant B. At equilibrium the solution contained 0.2 moles of A, 0.3 moles of B and 0.1 moles of C. If the reaction equation:

$$\text{A(aq)} + 2\text{B(aq)} \longrightarrow 2\text{C(aq)}$$
 Then the equilibrium constant K is:
 A) $\frac{5}{3}$
 B) $\frac{9}{5}$
 C) $\frac{3}{5}$
 D) $\frac{5}{9}$
87. Benzene has an extraordinary stable molecule because of:
 A) Delocalization of the electron cloud
 B) Localization of the electron cloud
 C) Regular tetrahedral structure
 D) Irregular hexagonal structure
88. Alkanes or Paraffins are made up of:
 A) Carbon, hydrogen and oxygen only
 B) Carbon hydrogen and nitrogen only
 C) Carbon, hydrogen and magnesium
 D) Carbon and hydrogen only
89. When water freezes, it occupies:
 A) 9% more space
 B) Same amount of space
 C) 9% less space
 D) None of the above
90. At muree hills, water will boil at about:
 A) 102°C
 B) 69°C
 C) 98°C
 D) 100°C

ENGLISH

91. **The constraints that an engineer has to identify during project of design:**
A) May include available resources physical, imaginative or technical limitations, flexibility for future modification and addition
B) Do not include available resources
C) Include available resources only
D) Do not include requirements for cost, safety and service ability.
92. **By understanding the constraints engineers derive specifications for the limits:**
A) With which a viable object may be produced
B) Within which a viable system may be operated
C) None of two options in A and B
D) Both of the two operations
93. **Engineers have an opportunity to learn new material throughout their careers:**
A) Because they have to learn knowledge of relevant sciences to complete to their design project.
B) Because they do only routine office jobs.
C) Because they have to learn knowledge of relevant sciences to complete their design
D) Because they forget mathematics and science after graduation
94. **Engineers are different from her professionals in that:**
A) They have to identify, understand and interpret the constraints on a design in order to produce a successful result.
B) They merely design projects without identifying, understanding and interpreting the constraints on a design.
C) They just try to produce a successful result
D) None of the above
95. **Engineers curriculum must:**
A) Not include subject of science
B) Include social sciences only because engineering is learnt, by experience only.
C) Include subjects of sciences, mathematics, logic and economics.
D) Must only include industrial training.
96. **One of the most important aspect in engineering design is:**
A) To ensure that there will be not be any unintended harm to the public at large.
B) To ensure that maximum money is earned even if it is at the expense of safety of general public.
C) To ensure that mathematics and science equations are satisfied even if it causes loss to the general public.
D) To ensure that boss is satisfied even if the design is wrong
97. **Engineers use among other things prototypes non-destructive tests and stress test in:**
A) Ensure that they earn money
B) Ensure that time is wasted
C) Ensure that they product performs as expected
D) To ensure that boss is satisfied even if the design is wrong
98. **The above paragraph has been taken from:**
A) Wikipedia-the free encyclopedia
B) Encyclopedia Britannia
C) Mc Graw hill science engineering encyclopedia
D) Newspaper
99. **The study of failed products is known as forensic engineering, it can help.**
A) The product designer in evaluating his or her design in the light if realcondition
B) Establish the cause or causes of failure of a project
C) Avoid major disasters in future
D) All of the above
100. **Usually multiple reasonable solutions exist so engineers:**
A) Must choose the solution that best meets their requirements.
B) Just pick a solution randomly.
C) Just copy a solution from some colleague.
D) Must evaluate the different design choices on their merits and choose the solution that best meets their requirements.