Pakistan Institute of Engineering & Applied Sciences

Admission Test (SAMPLE)

Note: Write in BLOCK letters

Roll No: _____ Sheet No: _____

Name: _____ Centre: _____

Signature: _____ Time Allowed: (3) Hrs

1. Make sure that the question book given to you contains hundred (100) questions in all i.e. twenty five (25) questions in each Section I, II, III and IV.
2. **Check if you are provided with an answer sheet consisting of one page only.**
3. **Do not bend, roll or fold the printed answer sheet.**
4. You must write your **Roll No**., **Name**, **Exam city** and put your **signature** in the spaces provided on this page and also on the answer sheet.
5. On the printed answer sheet, there are FOUR choices (i.e. A, B, C, and D) for each question. **Fill the appropriate choice only with a black marker**. If you wish to change your answer, you may do so by erasing the previous answer. Do not overwrite or fill more than one choice for a single question.
6. Each correct answer will carry **THREE** marks. For each incorrect answer **ONE** mark will be deducted.
7. The question paper is divided into **Four** Sections. As your performance in the written test depends on doing well in **ALL the Four Sections**, you are strongly advised to attempt as many questions as you can from each section.
8. You can carry out your rough work anywhere in the question book.
9. Put your pens down as soon as you hear **STOP WRITING**, otherwise your paper may be cancelled.
10. After the test is over, place your printed answer sheet inside the question paper and return both the question paper and the answer sheet to the invigilator.
11. **Mobile phones are strictly prohibited in the Examination Hall.**
12. You can use your own calculator only. Borrowing calculator is not allowed.
13. **Any one found using unfair means will be disqualified automatically.**

SAMPLE TEST PAPER

Section (I): English Comprehension (Questions 1-25)

Answer questions following a passage on the basis of what is stated or implied in that passage.

Questions 1 – 5

The general principles of dynamics are rules that demonstrate a relationship between the motions of bodies and the forces that produce those motions. Based in large part on the work of his predecessors, Sir Isaac Newton deduced three laws of dynamics, which he published in 1687 in his famous *Principia*.

Prior to Newton, Aristotle has established that the natural state of a body was a state of rest, and that unless a force acted upon it to maintain motion, a moving body would come to rest. Galileo had succeeded in correctly describing the behavior of falling objects and in recording that no force was required to maintain a body in motion. He noted that the effect of force was to change motion. Huygens recognized that a change in the direction of motion involved acceleration, just as did a change of speed, and further, that action of a force was required. Kepler deduced the laws describing the motion of planets around the sun. It was primarily from Galileo and Kepler that Newton borrowed.

Q1. What was the main purpose of this passage?

(A) To demonstrate the development of Newton's laws
(B) To establish Newton as the authority in the field of physics
(C) To discredit Newton's laws of motion
(D) To describe the motion of planets around the sun

Q2. Which of the following scientists established that the natural state of a body was a state of rest?

(A) Galileo (B) Kepler (C) Aristotle (D)Newton

Q3. Who was the first scientist to correctly describe the behavior of falling objects?

(A) Aristotle (B) Newton (C) Kepler (D) Galileo

Q4. According to Huygens, when was acceleration required?

(A) For a change in direction or in speed
(B) Only for a change in speed
(C) Only for a change in direction
(D) Neither for a change in direction more for a change in speed

Q5. According to the passage, Newton based his laws primarily upon the work of

(A) Galileo and Copernicus (C) Ptolemy and Copernicus
(B) Huygens and Kepler (D) Galileo and Kepler

Q6. The current trend toward specialization in nearly all occupational groups is exactly the opposite of what is needed. World problems today are so diverse, complex and interrelated that only the generalist stands a chance of understanding the broad picture. Unless our schools stress a truly broad, liberal us as we each expertly perform our own narrow factions.

Each of the following, if true, would weaken the conclusion drawn above, EXCEPT

(A) Many of the world's problems can be solved only by highly specialization experts working on specific problems.

(B) Relatively few generalists are needed to coordinate the work of the many specialists.

(C) Increasingly complex problems require a growing level of technical expertise, which can only be acquired through specialization.

(D) Even the traditional liberal education is becoming more highly specialized.

Q7. Aslam is standing to the right of Javaid. Anila is standing on the opposite side of Javaid. Since the opposite of right is wrong. Anila must be standing the wrong side of Javaid.

Which of the following logical errors has the author of the argument above committed?

(A) He has used a single term to mean two different things.

(B) He has confused cause and effect.

(C) He has assumed to be true what he wants to prove to be true.

(D) He has provided no factual evidence for his conclusion.

Q8. "The people do not run the country, neither do elected officials. The corporations run the country. Heads of corporations routinely and imperiously hand down decisions that profoundly affect millions of people. The people affected do not vote on the decisions, or for the corporate oligarchs. Yet we are supposed to believe we live in a democracy".

Which of the following statements, if true, would support the author's view?

I. Corporate lobbies strongly influence the introduction and passage of legislation at all levels of government.

II. Growing numbers of the most talented college graduates are going to work for private corporations rather than for government.

III. Few legal requirement are imposed on corporations as to the responsibilities they must fulfill to their employees and their communities.

(A) I only

(B) II only

(C) I and III only

(D) II and III only

Q9. The only unemployment problem we have is not that people can't find work, but they won't work. Thousands of jobs go begging everyday but the unemployed are too lazy to go out and find them.

The above argument would be more persuasive if it were established that

(A) The majority of available jobs require usually high levels of skill or experience or both.

(B) Most unemployed persons are back at work within six months.

(C) Most unemployed persons do not seek work until there unemployment benefits expire.

(D) A high unemployment rate has been fostered by the government in order to control inflation.

Q10. Leafleting and speechmaking on government property should be outlawed. Radicals and functions have no right to use public property when pending their unsavory views.

The argument above is based on the assumption that

(A) Radicals and fanatics prefer using public property when disseminating their views.

(B) The general public has a vested interest in the free exchange of varied political views.

(C) Political activities that interferes with the orderly functioning of government should not be protected by law.

(D) All those who leaflet and make speeches on government property are radicals and fanatics.

Q11.

Q12.

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Q25.

Section (II): Mathematics (Questions 26-50)

Q26. If f(x) = sin(x) for all x, then the average value of f on the interval [0, π] is

(A) ½ (B) $1/\pi$ (C) $\pi/2$ (D) $2/\pi$

Q27. $\frac{d}{dx}\left(e^x \ln x\right) =$

(A) $e^x\left(\frac{1}{x}+\ln x\right)$ (B) $\frac{1}{x}\left(e^x+\ln x\right)$ (C) $e^x+\frac{\ln x}{x}$ (D) $\frac{e^x}{x}+x$

Q28. $\begin{vmatrix} 0 & 0 & 1 & 2 & 3 \\ 1 & 2 & 3 & 4 & 5 \\ 0 & 0 & 0 & 3 & 4 \\ 0 & 1 & 0 & 2 & 3 \\ 0 & 0 & 0 & 0 & 2 \end{vmatrix} =$

(A) –6 (B) –3 (C) 6 (D) 0

Q29. $\int_0^{\frac{2}{3}} e^{-(3t-2)^2}\,dt =$

(A) $3\int_0^{\frac{2}{3}} e^{-u^2}\,du$ (B) $3\int_0^{2} e^{-u^2}\,du$ (C) $\frac{1}{3}\int_{-2}^{0} e^{-u^2}\,du$ (D) $3\int_{-2}^{0} e^{-u^2}\,du$

Q30. If $y^3 + xy^2-2x = 0$ defines y implicitly as a function of x, then the value of $\frac{dy}{dx}$ at the point (4, -2) is

(A) $-\frac{1}{2}$ (B) $-\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

Q31. If $a + d \neq 0$ and $\begin{pmatrix} a & b \\ c & d \end{pmatrix}^2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then *ad* is

(A) –1 (B) 0 (C) 2 (D) 1

Q32. $\lim_{x\to 0}\frac{1}{x}\left[\cos\left(\frac{\pi}{6}+x\right)-\cos\frac{\pi}{6}\right] =$

(A) $-\frac{\sqrt{3}}{2}$ (B) $-\frac{1}{2}$ (C) $\frac{1}{2}$ (D) Undefined

Q33. What is the y-intercept of the line tangent to the graph of y = $\frac{1}{x}$ at (2, $\frac{1}{2}$)?

(A) - $\frac{1}{2}$ (B) 0 (C) $\frac{1}{2}$ (D) 1

Q34. The number of values of x where the function f(x) = cosx + cos($\sqrt{2}$ x) attains its maximum value is

(A) 0 (B) 1 (C) 2 (D) ∞

Q35. If f(x) = x^3- 3x + 3x then $f(\sqrt[3]{7}+1)$ equals

(A) 6 (B) 7 (C) 8 (D) 9

Q36. If the number of subsets with 4 elements of a set A is equal to the number of subsets with 5 elements of the set, then the number of subsets with 3 elements of this set is:

(A) 64 (B) 84 (C) 128 (D) none of the above

Q37. If f (a.b) = f(a) + f(b) and f (2) = 3, then f (32) equals

(A) 9 (B) 12 (C) 15 (D) none of the above

Q38. If f (x) = x-2 and g (x,y) = y^2 + x, then g (3, f(4)) is

(A) 7 (B) 14 (C) 21 (D) 28

Q39. If m men can do a job in d days, then m+r men can do the job in:

(A) d-r days (B) $\frac{md}{m+r}$ days (C) $\frac{d}{d+r}$ days (D) none of the above

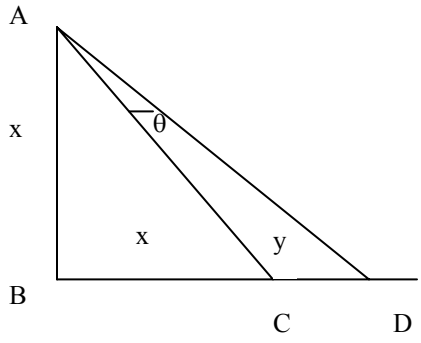
Q40. Tan θ in the accompanying diagram is:

(A) $\frac{y}{y+2x}$

(B) $\frac{x}{y+x}$

(C) $\frac{y}{y+x}$

(D) $\frac{y}{x}$



Q41. How many different 3-digit number divisible by 5 can be formed using the elements of the set A = {1,2,3,4,5,6}

(A) 36 (B) 24 (C) 40 (D) none of the above

Q42. The sum of the integral values of x so that the function f (x) = $\frac{\sqrt{5-x}}{\sqrt{x-1}}$ is defined in the set of real numbers is:

(A) 14 (B) 15 (C) 5 (D) none of the above

Q43. If $f(x) = 4^x$ then f(x+1) – f(x) equals

(A) 4 (B) f(x) (C) 2f(x) (D) 3f(x)

Q44. The sum of roots of equation $x^2 - x + 1 = 0$ is:

(A) 2 (B) 1 (C) -2 (D) -1

Q45. $\sum_{n\to 0}^{\infty}\left(\frac{1}{4}\right)^n$ =

(A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{2}{4}$ (D) none of the above

Q46. Minimum number of points required to define a plane are

(A) 1 (B) 2 (C) 3 (D) 4

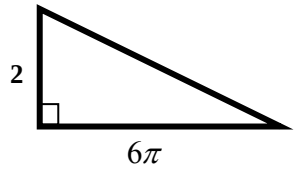
Q47. If $x = 1 + i$ where $i = \sqrt{-1}$, then x^5 is:

(A) 2-2i (B) 2+2i (C) -2-2i (D) -2+2i

Q48. $\log_2 x = \log_c x$/?

(A) $\log_2 2$ (B) $\log_2 c$ (C) $\log_c 2$ (D) $\log_c c$

Q49. What is the radius of the circle with area equal to the area of the following right triangle?



(A) $\sqrt{3}$ (B) $2\sqrt{3}$ (C) $\sqrt{6}$ (D) $2\sqrt{6}$

Q50. Twelve students in a class average 70% on a certain test. Eighteen others average 80%. What is the overall average of the thirty students as a percent?

(A) $74\frac{3}{4}$ (B) $75\frac{1}{4}$ (C) 76 (D) $77\frac{1}{8}$

Section (III): Physics (Questions 51-75)

Q51. Of the following subatomic particles, the particle which has the same charge as the positron is;

(A) Photon (C) Electron
(B) Alpha particle (D) Proton

Q52. A ball is projected vertically upward from the surface of the earth and reaches its maximum height in 4.0 seconds. The ball's initial speed, in meters per second is approximately

(A) 20 (B) 40 (C) 80 (D) 100

Q53. The conductivity in metallic wires depends on

(A) Free electrons only
(B) Positive ions only
(C) Negative ions only
(D) Positive ions, negative ions and electrons

Q54. Momentum is a quantity whose unit might be the

(A) foot-pound (C) erg
(B) newton (D) gram centimeter per second

Q55. Two rectangular tanks stand next to each other on a horizontal table. The area of the bottom of the first tank is 40 square centimeters; that of the second tank is 80 square centimeters. Both tanks are filled with water to the same height. The ratio of the liquid pressure on the bottom of the second tank to that of the bottom of the first tank is

(A) 1 (B) 2 (C) 4 (D) 16

Q56. Two freely falling objects, one 10 kg and one 20 kg, are dropped from the same height at the same time. Air resistance is negligible. Which of the following statements is (are) true?

I. Both objects have the same potential energy at the top.
II. Both objects fall with the same acceleration.
III. Both objects have the same speed just before hitting the ground.

(A) III only (B) I and II only (C) II and III only (D) I, II, and II

Q57. If a stone at the end of a string is whirled in a circle, the inward pull of the string on the stone

(A) is inversely proportional to the speed of the object
(B) is inversely proportional to the square of the speed
(C) is proportional to the speed
(D) is proportional to the square of the speed

Q58. A change in temperature of 450 C corresponds to a change in Fahrenheit degrees of

(A) 25 (B) 45 (C) 81 (D) 113

Q59. The bending of a bimetallic strip when heated is primarily due to

(A) the good conductivity of the two metals
(B) the large coefficient of expansion of both metals
(C) the unequal expansion of the two metals
(D) the effect of gravity

Q60. If a gas is heated at constant pressure, which of the following descriptions will apply?

I. Its volume increase is proportional to the temperature
II. The kinetic energy of the molecules decreases
III. The kinetic energy of the molecules increases

(A) I only (C) I and II only
(B) I and III only (D) II and III only

Q61. A 20 ohm and a 60 ohm resistor are connected in series to a DC generator. The voltage across the 20 ohm resistor is 80 volts. The current through the 60 ohm resistor

(A) cannot be calculated with the given information
(B) is about 1.3 A
(C) is 4.0 A
(D) is 5.0 A

Q62. An object is placed 10 centimeters from a concave spherical mirror whose radius of curvature is 12 centimeters. The distance of the image from the mirror is

(A) 5 cm (B) 10 cm (C) 15 cm (D) 20 cm

Q63. Two frequencies sounded together produce 3 beats per second. If one of the frequencies is 400 vibrations per second, the other frequency will be?

(A) 1200 vib/sec (C) 403 vib/sec
(B) 397 vib/sec (D) 133.33 vib/sec

Q64. X rays consist of

(A) a stream of neutrons (C) a stream of electrons
(B) radiation similar to radon (D) radiation similar to gamma rays

Q65. During the time that sound travels 1100 feet in air, light can travel in vacuum a distance of about

(A) 1100 miles (B) 200000 miles (C) 20000 miles (D) 11000 km

Q66. A spacecraft is approaching the earth. Relative to the radio signals it sends out, the signal received on the earth have

(A) a lower frequency (C) a higher velocity
(B) a shorter wavelength (D) all of the above

Q67. All of the following pure elements are good electrical conductors except

(A) copper (B) aluminum (C) silver (D) iron

Q68. Which of the following examples of electromagnetic radiation has the most energy per quantum?

(A) Radio waves (B) Microwaves (C) visible light (D) X-rays

Q69. Three capacitors each of value 0.1F are connected in series, then there total capacitance is closest to

(A) 0.0333F (B) 0.3333F (C) 0.3F (D) 3.0F

Q70. Atomic spectra can be explained by

(A) The Bohr atomic model (C) Quantum Mechanics
(B) Quantized orbits of electrons (D) All of the above

Q71. When $^{235}_{92}U$ decays by alpha particle emission, the daughter nuclei formed is

(A) $^{231}_{90}Th$ (B) $^{233}_{91}Pa$ (C) $^{234}_{91}Pa$ (D) $^{239}_{94}Pu$

Q72. We can increase the capacitance of a parallel plate capacitor by

(A) cooling the plates.
(B) bringing the plates closer together.
(C) decreasing the dielectric constant of the material between the plates.
(D) increasing the voltage across the plates.

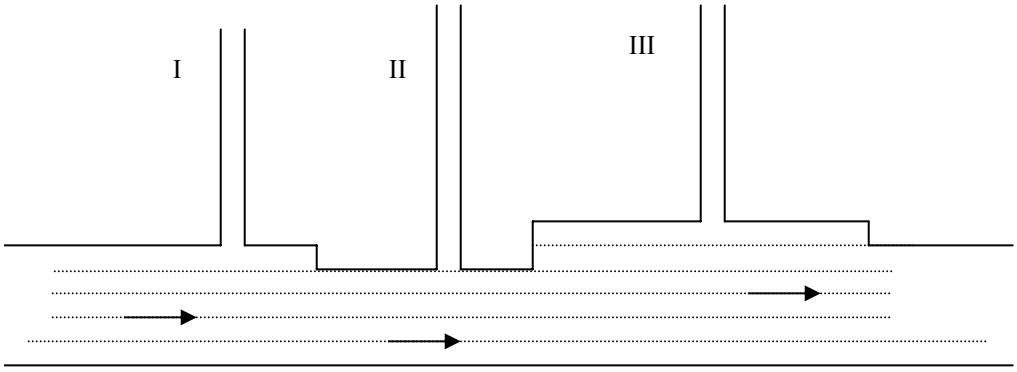
Q73. Terminal velocity is usually defined as the

(A) velocity of shock waves
(B) velocity of light in water
(C) velocity at which air resistance balances gravity
(D) All of the above

Q74. Our sun releases energy by nuclear fusion reactions. What actually happens?

(A) Hydrogen is converted to helium
(B) Helium is converted to hydrogen
(C) Two nuclei change into one nucleus
(D) One nucleus splits into two nuclei

Q75. Water flowing through a tube having variable cross-sectional area is shown in the figure below.



The water will attain the maximum level in

(A) tube I (B) tube II (C) tube III (D) all the tubes.

Section (IV): Chemistry (Questions 76-100)

Q76. 1 mole of hydrogen gas is reacted with 1 mole of iodine vapour. After t second, 0.8 mole of hydrogen remains. The number of moles of hydrogen iodide formed at t seconds is

(A) 0.2 (B) 0.4 (C) 0.8 (D) 1.6

Q77. Liquid petrol does not ignite spontaneously when exposed to the air because

(A) The ΔH for the combustion of petrol is positive
(B) Reaction between petrol and oxygen requires a catalyst
(C) The reactants are in different physical states
(D) Not enough molecules possess sufficient energy to react

Q78. In the reaction represented by the equation $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$, the forward reaction is exothermic. Which set of conditions would give the best yield of ammonia at equilibrium?

A) 800 atmospheres and 2000 °C
B) 1 atmosphere and 500 °C
C) 1 atmosphere and 2000 °C
D) 800 atmospheres and 500 °C

Q79. A sample of copper powder was contaminated with zinc dust. Pure copper was obtained from it by heating with excess of acid, filtering and washing. Which of the following acids was used?

(A) Dilute nitric acid
(B) Concentrated nitric acid
(C) Dilute hydrochloric acid
(D) Concentrated sulphuric acid

Q80. In the reaction $2C(s) + O_2 \longrightarrow 2CO(g)$, what mass of carbon is required to form 2.24 liters of CO at S.T.P.?

(A) 0.6 g (B) 1.2 g (C) 6.0 g (D) 12.0 g

Q81. One faraday of electricity will liberate one gram-atom of the metal form a solution of

(A) $AuCl_3$ (B) $BaCl_2$ (C) $CuSO_4$ (D) NaCl

Q82. The composition of air by volume is approximately 1/5 oxygen, 4/5 nitrogen. When air is passed through red-hot carbon, the following reaction occurs: $2C + O_2(g) \longrightarrow 2CO(g)$. If all of the oxygen is converted to carbon monoxide, what is the composition, by volume, of the gas produced?

(A) 1/5 carbon monoxide, 4/5 nitrogen
(B) 1/3 carbon monoxide, 2/3 nitrogen
(C) 2/5 carbon monoxide, 3/5 nitrogen
(D) 1/2 carbon monoxide, 1/2 nitrogen

Q83. An element does not conduct electricity. When it is burned in oxygen and the product is added to water, the resulting solution has a pH less than 7. The element could be

(A) Silicon (B) Sodium (C) Sulphur (D) Aluminium

Q84. Which electron arrangement represents the atom of the most active non-metal?

(A) 2, 6 (B) 2, 8, 6 (C) 2, 7 (D) 2, 8, 7

Q85. Which of the following gases does not give a precipitate with an ammoniacal solution of silver nitrate but decolourizes KMnO4?

(A) Acetylene
(B) Ethane
(C) Ethylene
(D) Methane

Q86. Benzaldehyde reacts with PCl5 to give

(A) Benzal chloride
(B) Benzoyl chloride
(C) Benzyl chloride
(D) Benzophenone

Q87. Which is the final product of reduction of nitrobenzene?

(A) Aniline
(B) Azobenzene
(C) Nitrosobenzene
(D) Phenylhydroxylamine

Q88. The type of isomerism not found in alkenes is

(A) Chain isomerism
(B) Mesomerism
(C) Position isomerism
(D) Geometrical isomerism

Q89. Which of the following will dissolve in sodium hydroxide solution?

(A) Toluene (B) Phenol (C) Aniline (D) Benzene

Q90. Which of the following describes the effect of a catalyst?

	Activation energy	Enthalpy of reaction
(A)	decreased	decreased
(B)	decreased	increased
(C)	unchanged	decreased
(D)	decreased	unchanged

Q91.

Q92.

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Q100.