

**OPENDET - XI : Entrance Test for
Engineering Diploma Programmes
JANUARY, 2009**

00247

Total No. of Questions = 100

Time : 2 Hours

- All questions are *Compulsory*.
- Use of calculator is *not* allowed. Rough work may be done in the space provided at the end of the Test Booklet.
- The Test Booklet has the following *four* tests :

Test - I	Mathematics	No. of Questions 40
Test - II	Physics	No. of Questions 20
Test - III	Chemistry	No. of Questions 20
Test - IV	General Awareness and Communication Skills	No. of Questions 20

Read the instructions given on the OMR Answer Sheet carefully before you start.

HOW TO FILL UP THE INFORMATION ON THE ENTRANCE TEST OMR ANSWER SHEET

While filling up the OMR Answer Sheet, you should follow the following guidelines :

1. Write your complete Roll Number. This should correspond to the roll number already supplied to you. Also write your correct name, address with pin code in the space provided, in ink. Put your signatures on the Answer Sheet with date, in ink. Ensure that the Invigilator in your examination hall also puts his signatures with date on the OMR Answer Sheet at the space provided. You should use HB pencil to mark the answers of the questions on the OMR Answer Sheet.
2. Do not make any stray marks on the OMR Answer Sheet.
3. Write correct information in numerical digits in Roll No., Programme Code, Date and Month and Examination Centre Code Columns. **The column of Course Code should be left blank.** The corresponding circle should be dark enough and should be filled in completely.
4. Each question is followed by four probable answers which are numbered 1, 2, 3 and 4. You should select and show only one answer to each question considered by you as the most appropriate or the correct answer. Select the most appropriate answer. Then by using HB pencil, blacken the circle bearing the correct answer number against the serial number of the question. **If you find that answer to any question is none of the four alternatives given under the question you should darken the circle with '0'.**
5. If you wish to change your answer, ERASE completely the already darkened circle by using a good quality eraser and then blacken the circle bearing your revised answer number. If incorrect answer is not erased completely, smudges will be left on the erased circle and the question will be read as having two answers by the Optical Mark Reader (OMR) and will be ignored for giving any credit.
6. No credit will be given if more than one answer is given for one question. Therefore, you should select the most appropriate answer.
7. You should not spend too much time on any one question. If you find any particular question difficult, leave it and go to the next. If you have time left after answering all the questions, you may go back to the unanswered ones.
8. There is no negative marking for wrong answers.

GENERAL INSTRUCTIONS

1. Mobile Phones, calculators, books, slide-rules, foot rulers, note-books or written notes, etc. are not allowed inside the examination hall.
2. You should follow the instructions given by the Centre Superintendent, Observers and by the Invigilators at the examination venue. If you violate the instructions you will be disqualified.
3. Any candidate found copying or receiving or giving assistance in the examination will be disqualified.
4. The Test Booklet and the OMR Answer Sheet would be supplied to you by the Invigilators. **After the exam is over, you should hand over the Test Booklet and the OMR Answer Sheet to the Invigilator before leaving the examination hall.** Any candidate who does not return the Question Booklet and the OMR Answer Sheet will be disqualified.
5. Candidates arriving late will not be permitted to enter the examination hall. The reporting time is 9.15 A.M. The examination will start at 10.00 A.M. and will be over at 12.00 noon.
6. All rough work is to be done on the test booklet itself and not on any other paper. Scrap paper is not permitted. For arriving at answers you may work in the margins, make some markings or underline in the test booklet itself.
7. The University reserves the right to cancel scores of any candidate who impersonates or uses malpractices. The examination is conducted under uniform conditions. The University would also follow a procedure to verify the validity of scores of all examinees uniformly. If there is substantial indication that your performance is not genuine, the University may cancel your score.

TEST - I
MATHEMATICS

1. The ages of X and Y are in the ratio of 3 : 1. Fifteen years hence, the ratio will be 2 : 1. Their present ages (in years) are :
(1) 30, 10 (2) 45, 15 (3) 21, 7 (4) 60, 20

2. Two numbers are in the ratio of 3 : 4 and the product of their L.C.M and H.C.F is 10800. The sum of the numbers is :
(1) 180 (2) 210 (3) 225 (4) 240

3. A sum of money is divided among A, B and C such that to each rupee A gets, B gets 65 paise, and C gets 35 paise. If C's share is Rs. 28 the sum is :
(1) Rs. 120 (2) Rs. 140 (3) Rs. 160 (4) Rs. 180

4. What will come in place of the question mark (?) in the following number series ?
3 18 108 648 (?) 23328
(1) 3888 (2) 3240 (3) 2592 (4) 1944

5. What will come in place of the question mark (?) in the following question ?
 $6x^2 + 4 = 868; x = ?$
(1) 34 (2) 12 (3) 56 (4) 14

6. A train running at a speed of 90 km per hour crosses a platform double its length in 36 seconds. What is the length of the platform in metres ?
(1) 450 m. (2) 200 m. (3) 600 m. (4) 300 m.

7. Sixteen men can complete a work in twelve days. In how many days will twenty four men complete the same work ?
(1) 4 (2) 8 (3) 6 (4) 3

8. The price of two tables and three chairs is Rs. 5600. What will be the price of six tables and nine chairs ?
(1) Rs. 16800 (2) Rs. 11200 (3) Rs. 22400 (4) None of these

9. A shopkeeper sold some articles at the rate of Rs. 35 per article and earned a profit of 40%. At what price each article should have been sold so that 60% profit was earned ?
(1) Rs. 45 (2) Rs. 42 (3) Rs. 39 (4) Rs. 40

10. If a number is reduced by 40% it becomes two-third of another number. What is the ratio of the first number to the second number ?

- (1) 10 : 9 (2) 8 : 9 (3) 9 : 8 (4) 9 : 10

11. The area of a rectangular field is 2100 m². If the field is 60 m long, what is its perimeter ?

- (1) 180 m (2) 200 m (3) 240 m (4) None of these

12. What will come in place of the question mark (?) ?

$$\sqrt{\sqrt{625} + \sqrt{576}} = ?$$

- (1) 49 (2) 8 (3) 54 (4) 7

13. What will come in place of the question mark (?) ?

$$99.99 + 666.66 = ?$$

- (1) 728.59 (2) 766 (3) 766.65 (4) 676.95

14. What will come in place of the question mark (?) ?

$$x^2 \times x^3 = ?$$

- (1) x² (2) x³ (3) x⁶ (4) None of these

15. What will come in place of the question mark (?) ?

$$3.75 \times 4.5 = ?$$

- (1) 0.1687 (2) 1.6875 (3) 16.875 (4) 6.875

16. What will come in place of the question mark (?) ?

$$\frac{\sqrt{36} \times 3 - 5 \times 7}{-4 \times \sqrt{289}} = ?$$

- (1) $\frac{1}{2}$ (2) $\frac{1}{8}$ (3) $\frac{3}{4}$ (4) None of these

17. The amount of simple interest accrued on a principal of Rs. 25000 in 7 years is Rs. 21000, what is the rate of interest per annum ?

- (1) 15 (2) 10 (3) 18 (4) 12

18. If the length of a rectangular field is 48 m more than its breadth and the perimeter of the field is 800 m, what is the area of the field ?
 (1) 39424 m^2 (2) 40000 m^2 (3) 31376 m^2 (4) None of these
19. What is the area of a circle whose radius is 14 m ?
 (1) 88 m^2 (2) 616 m^2 (3) 626 m^2 (4) 44 m^2
20. What is the circumference in centimetres of a circle whose area is 49π square centimetres ?
 (1) 28π (2) 14π (3) 7π (4) 21π
21. The average of eight numbers taken together is 12. Two of these numbers are 0 and the remaining numbers are equal. What is the value of the non zero number ?
 (1) 16 (2) 12 (3) 6 (4) 18
22. What will be the cost of tiling the floor at the rate of Rs. 38/- per square metre, if the hall is of a square shape and has a perimeter of 400 metres ?
 (1) Rs. 19000 (2) Rs. 57000 (3) Rs. 380000 (4) Rs. 9500
23. The salaries of A, B and C are in the ratio of 1 : 2 : 3. The salary of B and C together is Rs. 6000. By what percent is the salary of C more than that of A ?
 (1) 100% (2) 200% (3) 300% (4) 600%
24. 85 kg of a mixture contains milk and water in a ratio 27 : 7. How much more water is to be added to get a new mixture containing milk and water in the ratio 3 : 1 ?
 (1) 5 kg (2) 6.5 kg (3) 7.25 kg (4) 8 kg
25. Two equal glasses are respectively $\frac{1}{3}$ and $\frac{1}{4}$ full of milk. They are then filled with water and the contents mixed in a tumbler. The ratio of milk and water in the tumbler is :
 (1) 7 : 5 (2) 7 : 17 (3) 9 : 21 (4) 11 : 23
26. If $A : B = B : C = C : D$ and $A = 27$. Then D is :
 (1) 45 (2) 60 (3) 75 (4) 125
27. When 60% of a number is added to 60, the result is number itself. The number is :
 (1) 80 (2) 120 (3) 140 (4) 150

28. If 1 is added to both numerator and denominator of a fraction, it becomes $\frac{4}{5}$ and if 5 is subtracted from both numerator and denominator it becomes $\frac{1}{2}$ the fraction is :

- (1) $\frac{6}{7}$ (2) $\frac{7}{9}$ (3) $\frac{3}{4}$ (4) $\frac{5}{6}$

29. The value of $10^3 - 7^3 - 3^3$ is :

- (1) 10 (2) 7 (3) 3 (4) None of these

30. If A is greater than B by 20% then B is less than A by :

- (1) 20% (2) $16\frac{2}{3}\%$ (3) 10% (4) $83\frac{1}{3}\%$

31. The value of $(\sqrt{5} + \sqrt{3})(\sqrt{5} - \sqrt{3})$ is :

- (1) $\sqrt{2}$ (2) 3 (3) 5 (4) 2

32. The measure of an angle which is five times its supplement is :

- (1) 36° (2) 30° (3) 150° (4) 180°

33. The volume of a right circular cylinder whose diameter is 10 m and whose height is 4 m is :

- (1) $40 \pi \text{ m}^3$ (2) $20 \pi \text{ m}^3$ (3) $100 \pi \text{ m}^3$ (4) $80 \pi \text{ m}^3$

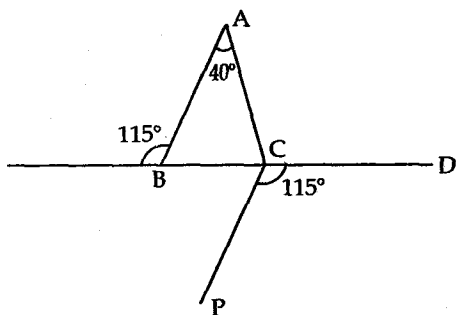
34. Three metal cubes with edges 6 cm, 8 cm and 10 cm respectively are melted together and formed into a single cube. Find the edge of the cube.

- (1) 24 cm (2) 12 cm (3) $12\sqrt{3}$ cm (4) 15 cm

35. If $\left(x + \frac{1}{x}\right)^2 = a$, then $x^3 + \frac{1}{x^3}$ is equal to :

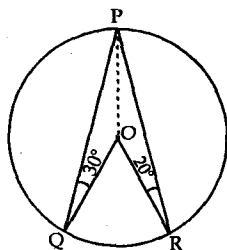
- (1) a^3 (2) $a^{3/2} - 3a^{1/2}$ (3) $a^{3/2}$ (4) $a^{3/2} + 3a^{1/2}$

36. In the adjoining figure, if $CP \parallel AB$. $\angle BAC = 40^\circ$ and $\angle PCD = 115^\circ$. Find $\angle ACB$.



- (1) 55° (2) 65° (3) 75° (4) 85°

37. In the given figure, O be the centre of circle, $\angle OQP = 30^\circ$, $\angle ORP = 20^\circ$, what is $\angle QOR$?



- (1) 120° (2) 100° (3) 200° (4) 260°

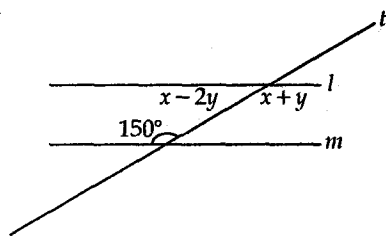
38. $(3 + \sqrt{7}) + (3 - \sqrt{7})$ is a :

- (1) Prime number (2) Rational number
(3) Irrational number (4) Odd number

39. Maximum number of points of intersection of four lines is :

- (1) 3 (2) 4 (3) 5 (4) 6

40. In the given figure $l \parallel m$, x is equal to :



- (1) 110° (2) 40° (3) 120° (4) 30°

TEST - II
PHYSICS

41. Ozone layer protects the earth from :
(1) Infrared radiation (2) Ultraviolet rays
(3) Cosmic rays (4) None of these
42. Electron was discovered by :
(1) Rutherford (2) Crooks
(3) J. J. Thomson (4) None of these
43. The instrument used for measuring intensity of earthquakes is called :
(1) Ediograph (2) Pantograph
(3) Ergograph (4) Seismograph
44. Dimension of work is :
(1) ML^2T^{-2} (2) ML^2T^{-1} (3) ML^3T^{-1} (4) MLT^{-1}
45. In an electrical circuit, a fuse is connected :
(1) in the live wire (2) in the neutral wire
(3) in the earth wire (4) anywhere it makes no difference
46. Which of the following is measured on the Richter scale ?
(1) wind velocity (2) earthquakes
(3) depth (4) heat
47. One nanometer is equal to :
(1) 10^9 mm (2) 10^{-6} cm (3) 10^{-7} cm (4) 10^{-9} cm
48. The ratio of the distance covered to the displacement covered by a body along a semicircle of radius r is :
(1) 2π (2) $\frac{\pi}{2}$ (3) π (4) None of these
49. Two bodies are moving in opposite direction with speed v . The magnitude of their relative velocity will be :
(1) 0 (2) v (3) $\frac{v}{2}$ (4) $2v$

50. Which of the following is a scalar quantity ?
 (1) distance (2) electric field
 (3) acceleration (4) linear momentum
51. Which one of the following is the unit of Power ?
 (1) Newton (2) Weber (3) Tesla (4) Watt
52. A particle projected horizontally from the top of a tower clears range equal to the height of the tower. The path described is a part of a :
 (1) circle (2) ellipse (3) hyperbola (4) parabola
53. If a body of mass 5 kg is moving with a velocity 2ms^{-1} , then the kinetic energy of the body is :
 (1) 20 J (2) 5 J (3) 10 J (4) 8 J
54. Two bodies of masses m_1 and m_2 ($m_1 > m_2$) and having momentum p_1 and p_2 move with the same velocity. Then which of the following is correct ?
 (1) $p_1 > p_2$ (2) $p_1 < p_2$ (3) $p_1 = p_2$ (4) none of these
55. The unit of impulse is the same as that of :
 (1) energy (2) momentum (3) power (4) velocity
56. Which of the following surface in contact has maximum co-efficient of friction ?
 (1) Wood on ice (2) Rubber tyre on dry concrete
 (3) Steel on steel (4) Rubber tyre on wet concrete
57. A ball is allowed to fall from a height of 10 m. If there is 40% loss of energy due to impact, then after one impact ball will go upto :
 (1) 10 m (2) 8 m (3) 4 m (4) 6 m
58. A bullet of mass ' a ' and velocity ' b ' is fired into a large block of mass ' c '. The final velocity of the system is :
 (1) $\frac{c}{a+b}b$ (2) $\frac{a}{a+c}b$ (3) $\frac{a+b}{c}a$ (4) $\frac{a+c}{a}b$
59. The power of an electric motor carries a tension of 4500 N in moving a cable at a rate of 2ms^{-1} is :
 (1) 15 kW (2) 9 kW (3) 225 W (4) 9000 HP
60. The property of the body in which the body regains its original shape or size after removal of an external force is called :
 (1) elasticity (2) rigidity (3) plasticity (4) inertia

TEST - III
CHEMISTRY

61. Which of the following is a homogenous mixture ?
(1) Solution (2) Suspension (3) Colloid (4) Sol
62. Milk of magnesia is an example of :
(1) Foam (2) Sol (3) Emulsion (4) Gel
63. The experimental discovery of neutrons was made by :
(1) Rutherford (2) Chadwick (3) Schrödinger (4) Thomson
64. The molecular mass of nitric acid is :
(1) 18 u (2) 25 u (3) 14 u (4) 63 u
65. The no. of molecules in 8g of O_2 molecules is :
(1) 12.044×10^{23} (2) 3.011×10^{22} (3) 1.5055×10^{23} (4) 6.022×10^{22}
66. Which of the following isotopes is used in the treatment of Cancer ?
(1) Isotope of Uranium (2) Isotope of Iodine
(3) Isotope of Cobalt (4) Isotope of Carbon
67. The two electrons present in an orbital are distinguished by :
(1) principal quantum number (2) azimuthal quantum number
(3) magnetic quantum number (4) spin quantum number
68. The number of unpaired electrons in Ni^{2+} ($z=28$) is :
(1) 0 (2) 2 (3) 4 (4) 8
69. Which of the following indicates a chemical change ?
(1) Glucose dissolved in water (2) Magnesium ribbon heated in a flame
(3) Rusting of iron (4) Melting of ice
70. The orbital diagram in which the *Aufbau* principle is violated is :
 $2s$ $2p_x$ $2p_y$ $2p_z$
(1) $\downarrow\uparrow$ $\downarrow\uparrow$ \uparrow
(2) \uparrow $\downarrow\uparrow$ \uparrow \uparrow
(3) $\downarrow\uparrow$ \uparrow \uparrow \uparrow
(4) $\downarrow\uparrow$ \uparrow $\downarrow\uparrow$ \uparrow
71. The molecule that has linear structure is :
(1) CO_2 (2) NO_2 (3) SO_2 (4) SiO_2

72. ${}^{40}_{20}\text{Ca}$ and ${}^{40}_{18}\text{Ar}$ are :
- (1) Isobars (2) Isomers (3) Isotones (4) Isotopes
73. The cathodic reduction in the electrolysis of dil. H_2SO_4 with platinum electrodes involves :
- (1) oxidation (2) reduction
(3) neutralization (4) both oxidation and reduction
74. Which of the following species have a bond order of 3 ?
- (1) N_2, NO (2) N_2, O_2^+ (3) $\text{O}_2^+, \text{NO}^+$ (4) CO, NO^+
75. When Zn is added to an aqueous solution of CuSO_4 the blue colour of the solution gradually fades. This is due to the :
- (1) oxidation of Zn (2) oxidation of copper
(3) reduction of Cu (4) reduction of Zn
76. $\text{CH}_3 - \overset{\text{OH}}{\underset{|}{\text{C}}} = \text{CH}_2$ contains :
- (1) 9 σ bonds, 1 π bond, 2 lone pairs
(2) 8 σ bonds, 2 π bonds, 2 lone pairs
(3) 10 σ bonds, 1 π bond, 1 lone pair
(4) 9 σ bonds, 2 π bonds, 1 lone pair
77. The volume of CO is 2.2 L at 0.95 atm. pressure. If the pressure increases to 1.1 atm. The volume of CO will be :
- (1) 1.90 L (2) 1.20 L (3) 1.80 L (4) 1.40 L
78. Which of the following is a cation ?
- (1) Na^+ (2) CO_3^- (3) CaCl_2 (4) Mg
79. One mole of Glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, on complete combustion will produce :
- (1) 1 mole of H_2O (2) 2 moles of H_2O
(3) 3 moles of H_2O (4) 6 moles of H_2O
80. The reaction $2 \text{H}_2\text{O}_2(\text{aq}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$ shows that H_2O_2 is undergoing :
- (1) decomposition (2) oxidation
(3) reduction (4) all of the above

TEST - IV
GENERAL AWARENESS AND COMMUNICATION SKILLS

81. The longest river in the world is :
(1) Amazon (Brazil) (2) Nile (Egypt)
(3) Yangtze (China) (4) Congo (Zaire)
82. Which is the capital of Cuba ?
(1) Mexico (2) Ottawa (3) Nigeria (4) Hawana
83. Who is the Supreme Commander of the Indian Armed Forces ?
(1) Prime Minister (2) President
(3) Chief Justice of India (4) Defence Minister
84. The oldest Indian language is :
(1) Telugu (2) Hindi (3) Tamil (4) Punjabi
85. The country known as 'The Sugar Bowl of the World' is :
(1) Japan (2) Fiji (3) Cuba (4) China
86. The play 'Shakuntala' was written by :
(1) Kalidasa (2) Maithili Sharan Gupt
(3) Swami Dayanand (4) Tulsi Das
87. Who is the winner of the IIFA Best Actor Award 2008 ?
(1) Hrithik Roshan (2) Shahrukh Khan
(3) Amitabh Bachchan (4) Abhishek Bachchan
88. The Lingaraj Temple built during the medieval period is situated at :
(1) Bhubaneshwar (2) Khajuraho
(3) Madurai (4) Mount Abu
89. Who completed 16000 runs in ODI recently ?
(1) Virender Sehwag (2) Sachin Tendulkar
(3) Sourabh Ganguly (4) Mahinder Singh Dhoni
90. Myopia is a disease connected with the :
(1) ears (2) eyes (3) lungs (4) brain

Directions : For questions 91, 92 and 93, state the choice closest in meaning to the given word (synonym) :

91. CONFIDENT :

- (1) deduction
- (2) assured
- (3) question
- (4) avoid

92. ELUDE :

- (1) ask
- (2) escape
- (3) passion
- (4) accurate

93. RECOLLECTIONS :

- (1) garments
- (2) remembering
- (3) disobedience
- (4) swear word

Directions : For questions 94, 95 and 96, select the choice closest to the opposite meaning of the given word (antonyms) :

94. FRUGAL :

- (1) quiet
- (2) economical
- (3) shy
- (4) generous

95. PUNITIVE :

- (1) rewarding
- (2) over-sized
- (3) relentless
- (4) active

96. PUERILE :

- (1) frugal
- (2) adult
- (3) frantic
- (4) audacious

Directions : For questions 97, 98, 99, 100, fill in the blanks with appropriate words :

97. If we do not stop spoiling the environment, many animals could be _____ and can only be found in pictures.

- (1) immature (2) invisible (3) solitary (4) extinct

98. I felt great _____ for Jack when he had to drop out of college to help support his family after his father died.

- (1) emotion (2) sentiment (3) sympathy (4) symptom

99. The professor wrote several comments _____ my paper.

- (1) in (2) on (3) about (4) to

100. Karan is very jealous _____ Arjun and it is very obvious to us.

- (1) of (2) about (3) at (4) with

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SPACE FOR ROUGH WORK