

**OPENDET – VIII : Entrance Test for
Engineering Diploma Programmes
May, 2007**

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 rectangle 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 rectangle 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 rectangle '0'.**
5. If you wish to change your answer, ERASE completely the already darkened rectangle by using a good quality eraser and then blacken the rectangle bearing your revised answer number. If incorrect answer is not erased completely, smudges will be left on the erased rectangle 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

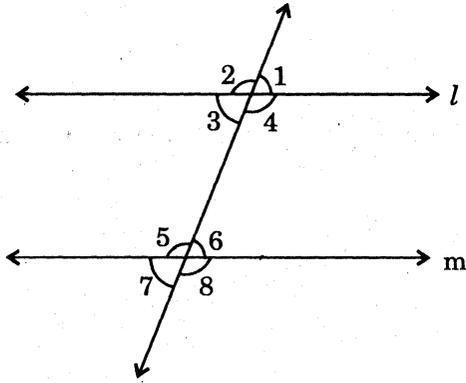
1. Mobile Phones, calculators, books, slide-rules, foot rulers, note-books or written notes, etc. are not allowed inside the examination hall.
2. You should follow the instructions given by the Centre Superintendent, Observers and by the Invigilators at the examination venue. If you violate the instructions 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. If a person is standing on the sixth number in a queue from both the ends then total persons in the queue are
- (1) 9 (2) 11
(3) 12 (4) 13
2. If x, y, z are the sides of a triangle then
- (1) $x + y = z$ (2) $x - z = y$
(3) $x + z > y$ (4) $x + z < y$
3. Cube root of $\frac{0.125}{64}$ is
- (1) $\frac{5}{4}$ (2) $\frac{0.5}{4}$
(3) $\frac{0.05}{4}$ (4) $\frac{0.005}{4}$
4. $\left(27 - \frac{2}{3}\right)^{1/2}$ is equal to
- (1) $\frac{1}{9}$ (2) $\frac{27}{54}$
(3) $\frac{2}{3}$ (4) $\frac{1}{3}$
5. $\sqrt[3]{3^{n+2}} = 9$, then $2^{n-1} = \dots$
- (1) 2 (2) 4
(3) 16 (4) 8
6. $\sqrt{2^n} = 32$, then $\frac{n-1}{n}$ is equal to
- (1) 9 (2) 0.9
(3) 10 (4) $\frac{10}{9}$
7. What should be added to $9x^2 - 30x + 15$ to make it a whole square ?
- (1) 25 (2) 10
(3) -15 (4) 0

8. If $x + \frac{1}{x} = 6$, then $x^2 + \frac{1}{x^2} = \dots$
- (1) 36 (2) 34
(3) 38 (4) 42
9. There are y girls out of total students x in a class. Then the ratio of the number of boys to girls is
- (1) $x : y$ (2) $y : x$
(3) $y : x + y$ (4) $x - y : y$
10. The cost of 55 books is Rs. 330. The number of books that can be purchased for Rs. 420 are
- (1) 80 (2) 70
(3) 60 (4) 90
11. Two numbers are in the ratio 8 : 11. If 6 is subtracted from each number and the ratio becomes 7 : 10, then the numbers are
- (1) 32, 44 (2) 40, 55
(3) 48, 66 (4) None of the above
12. If $x = 5$ and $y = 8$, and x and y vary inversely, then the constant of variation is
- (1) $\frac{5}{8}$ (2) 40
(3) 8 (4) 5
13. A man can complete a piece of work in 20 days. The amount of work done in 8 days will be
- (1) $\frac{2}{3}$ rd (2) $\frac{2}{5}$ th
(3) $\frac{3}{5}$ th (4) $\frac{1}{3}$ rd
14. 125% of 20 m is
- (1) 25 m (2) 24 m
(3) 30 m (4) 28 m
15. The number of lines we can get by joining four points in pairs, no three of them being collinear, is
- (1) 4 (2) 5
(3) 6 (4) 3

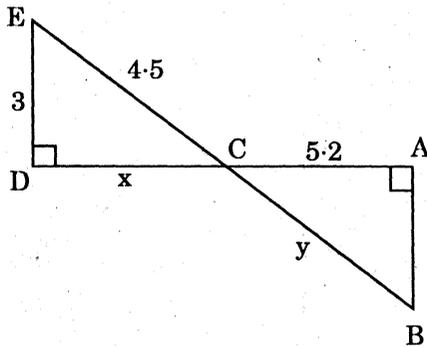
19. In the following figure, $l \parallel m$ and t is the transversal.



If $\angle 1 = (x + 50)^\circ$, $\angle 8 = (2x + 10)^\circ$, then $x = \dots$

- (1) 40° (2) 80°
 (3) 30° (4) 45°

20. In the following figure, $\angle EDC = \angle BAC = 90^\circ$, $x = \dots$



- (1) 4.2 (2) 3.4
 (3) 6 (4) 4.4

21. The length of the tangent drawn from a point whose distance from the centre of a circle is 25 cm, if the radius of the circle is 7 cm, is

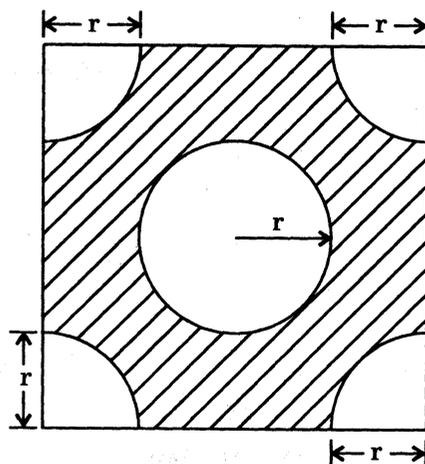
- (1) 26 cm
 (2) 24 cm
 (3) 18 cm
 (4) 16 cm

22. The perimeter of a square is $2(2x + 4y)$. It's area is

- (1) $(x + 2y)^2$
 (2) $(2x + 4y)^2$
 (3) $(2x + y)^2$
 (4) $4(2x + 4y)^2$

23. The area of a circle, whose circumference is 44 cm is
 (1) 38.5 cm^2 (2) 77 cm^2
 (3) 154 cm^2 (4) 88 cm^2
24. The circumference of two circles are in the ratio 2 : 3. The ratio of their areas is
 (1) 2 : 3 (2) 4 : 9
 (3) 9 : 4 (4) 3 : 2
25. The length of the longest rod that can be put in a room 12 m long, 9 m wide and 8 m high is
 (1) 17 m (2) 14 m
 (3) 15 m (4) 19 m

26. ABCD is a square of side x cm. The area of the shaded part is



- (1) $(x^2 - 2\pi r^2) \text{ cm}^2$
 (2) $(x^2 - \pi r^2) \text{ cm}^2$
 (3) $(x^2 - 3\pi r^2) \text{ cm}^2$
 (4) $(x^2 + \pi r^2) \text{ cm}^2$
27. If the length of a chord of a circle is equal to the radius of the circle, then the angle subtended by it at the centre is
 (1) 90° (2) 30°
 (3) 60° (4) 180°
28. Three bells begin tolling at the same time and they toll at intervals of 21, 28 and 30 seconds, respectively. The bells will toll together again after
 (1) 3 seconds (2) 50 seconds
 (3) 420 seconds (4) 5880 seconds

29. $x^2 = y^3$, $x^3 = p^2$, then

(1) $y^2 = p^3$

(2) $y^3 = p^5$

(3) $y^4 = p^9$

(4) $y^9 = p^4$

30. The level of water is doubled every minute in a bucket. If it is half filled in 10 minutes, then it will be completely filled in

(1) 20 minutes

(2) 40 minutes

(3) 11 minutes

(4) 1 hour

31. The perimeters of two square fields are 96 metres and 28 metres respectively. The perimeter of the third square field whose area is the sum of the areas of the (above) two square fields is

(1) 90 m

(2) 92 m

(3) 96 m

(4) 100 m

32. Find the value of k for which $x = 2$ is a solution of the equation $kx^2 + 2x - 3 = 0$.

(1) $\frac{1}{4}$

(2) $\frac{1}{2}$

(3) $-\frac{1}{2}$

(4) $-\frac{1}{4}$

33. Which term of the AP

2, 7, 12, 17, ... is 87 ?

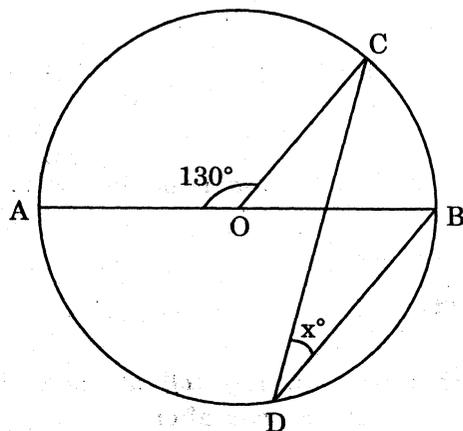
(1) 15th term

(2) 16th term

(3) 18th term

(4) 20th term

34. If O is the centre of the circle, then the value of x is



(1) 15

(2) 20

(3) 25

(4) 30

35. The value of $(1 - \sin^2 \theta) \sec^2 \theta$ is
- (1) 0
 - (2) 1
 - (3) $\frac{1}{2}$
 - (4) $\cos^2 \theta$
36. The value of $\sec 70^\circ \sin 20^\circ + \cos 20^\circ \operatorname{cosec} 70^\circ$ is
- (1) 0
 - (2) 1
 - (3) 2
 - (4) $\frac{1}{2}$
37. When 60% of a number is added to 60, the result is the number itself. The number is
- (1) 80
 - (2) 120
 - (3) 140
 - (4) 150
38. A vertical pole stands on the level ground. From a point on the ground, 25 m away from the foot of the pole, the angle of elevation of its top is found to be 60° . The height of the pole is
- (1) 25 m
 - (2) $\frac{25}{\sqrt{3}}$ m
 - (3) $25\sqrt{3}$ m
 - (4) 12.5 m
39. How many 3-digit numbers can be formed by using the digits 0, 2, 3 without repetition ?
- (1) 4
 - (2) 3
 - (3) 5
 - (4) 6
40. If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = a \times d - b \times c$, then $\begin{vmatrix} -3 & 5 \\ 6 & 7 \end{vmatrix}$
- (1) 51
 - (2) -51
 - (3) -9
 - (4) +9

TEST II PHYSICS

41. Dimension of Force is
- (1) $M L T^{-2}$
 - (2) $M^{-2} L^3 T^{-1}$
 - (3) $M^3 L^{-1} T^{-2}$
 - (4) $M^{-1} L^2 T^{-3}$
42. What is percentage error in volume of a sphere, when error in measuring its radius is 2% ?
- (1) 2%
 - (2) 4%
 - (3) 6%
 - (4) 8%
43. Which of the following is *not* a unit of time ?
- (1) Light year
 - (2) Nano second
 - (3) Micro second
 - (4) Pico second
44. Newton-sec is the unit of
- (1) Energy
 - (2) Momentum
 - (3) Angular momentum
 - (4) Velocity
45. A car is moving with a uniform velocity on a rough horizontal road. Then, according to Newton's first law of motion
- (1) no force is being applied by its engine
 - (2) a force is being applied by its engine
 - (3) an acceleration is being produced in the car
 - (4) kinetic energy of the car is increasing
46. What will be the ratio of the distance moved by a freely falling body from rest in 4 and 5 seconds of its journey ?
- (1) 4 : 5
 - (2) 5 : 6
 - (3) 7 : 8
 - (4) 16 : 25

47. A particle of mass m moving with a velocity v strikes a stationary particle of mass $2m$ and sticks to it. The speed of the system will be
- (1) $\frac{v}{2}$ (2) $2v$
(3) $\frac{v}{3}$ (4) $3v$
48. If the velocity is increased by 50%, what will be the percentage change in the linear momentum ?
- (1) Increases by 100%
(2) Decreases by 100%
(3) Increases by 50%
(4) Decreases by 50%
49. When a bullet is fired from a rifle,
- (1) the bullet has greater kinetic energy and greater momentum
(2) the bullet has less kinetic energy but greater momentum
(3) the bullet has less kinetic energy, but more speed
(4) the bullet has more kinetic energy, but momentum of bullet and rifle are equal
50. A force F is applied to a body which then moves with a velocity v , the power will be
- (1) Fv (2) $\frac{F}{v}$
(3) Fv^2 (4) $\frac{F}{v^2}$
51. The greatest height to which a man can throw a stone is 'h'. Then the greatest horizontal distance to which he can throw the stone is
- (1) $\frac{h}{2}$ (2) h
(3) $2h$ (4) $4h$
52. An electric fan is switched on in a closed room. The air in the room is
- (1) cooled
(2) heated
(3) at constant room temperature
(4) heated or cooled depending on atmospheric pressure
53. The clouds float in the atmosphere because of their low
- (1) Pressure (2) Velocity
(3) Temperature (4) Density

54. Most of the comets moving round the sun have orbits of the shape of
- (1) a parabola
 - (2) a hyperbola
 - (3) a circle
 - (4) an elongated ellipse
55. A beam of monochromatic light of wavelength ' λ ' is refracted from air to water of refractive index $\frac{4}{3}$. The wavelength of light beam inside water will be
- (1) $\frac{9\lambda}{16}$
 - (2) $\frac{3\lambda}{4}$
 - (3) $\frac{4\lambda}{3}$
 - (4) λ
56. Waves which have shortest wavelength are
- (1) Heat
 - (2) X-rays
 - (3) Sound
 - (4) Light
57. Wave motion which will *not* pass through vacuum is
- (1) Microwave
 - (2) Gamma rays
 - (3) Radio waves
 - (4) Ultrasonic
58. The earth wire is connected to the metal case of an electrical appliance. The reason for this is
- (1) to complete electric circuit for the current flow
 - (2) to prevent a short circuit
 - (3) to reduce the current if there is too much flow
 - (4) to prevent any possibility of the case of the appliance remaining live
59. An electric lamp is marked '220 V 100 W'. The full significance of this is
- (1) it must be operated only on 220 V and consumes 100 watts power
 - (2) it does not operate on any other voltage
 - (3) it glows fully on 220 V and consumes 100 watts power
 - (4) None of these
60. If by mistake, some radioactive substance gets into the human body, then from radiations damage point of view, which will be the most harmful ?
- (1) Gamma rays
 - (2) Alpha rays
 - (3) Neutrons
 - (4) Beta rays

TEST III
CHEMISTRY

61. The positive catalyst is the one
- (1) which increases the speed of a chemical reaction
 - (2) which slows down the speed of a chemical reaction
 - (3) which leads to decomposition of hydrogen peroxide
 - (4) which leads to oxidation of sodium sulphite
62. A chemical change occurs when
- (1) sodium chloride dissolves in water
 - (2) iron rusts
 - (3) iron is magnetised
 - (4) platinum wire is heated in a flame
63. The formula for sulphite radical is
- (1) S^{--}
 - (2) SO_4^{--}
 - (3) SO_3^{--}
 - (4) SO_2^{--}
64. Valency of carbonate is
- (1) - 1
 - (2) - 2
 - (3) - 3
 - (4) - 4
65. A gas has a volume of 100 c.c. when the pressure is 735 mm of mercury. What volume will the gas occupy at 700 mm pressure, when the temperature is kept constant ?
- (1) 110 c.c.
 - (2) 205 c.c.
 - (3) 105 c.c.
 - (4) 120 c.c.
66. The volume of a given mass of gas varies inversely as the pressure, if the temperature is kept constant. This is called
- (1) Boyle's law
 - (2) Charles' law
 - (3) Dalton's law
 - (4) Graham's law

67. The formula for determination of molecular weight is
- (1) Atomic weight $\times 2$
 - (2) Equivalent weight $\times 2$
 - (3) $\frac{\text{Equivalent weight}}{2}$
 - (4) $2 \times \text{vapour density}$
68. Equal volumes of all gases under the similar conditions of temperature and pressure contain equal number of molecules, is called as
- (1) Gay-Lussac's law
 - (2) Boyle's law
 - (3) Berziliium hypothesis
 - (4) Avogadro's hypothesis
69. How many gram molecules are contained in 68 gm of hydrogen sulphide ?
- (1) 1
 - (2) 2
 - (3) 34
 - (4) 16
70. The molecular weight of a base is W. It's acidity is 2. It's equivalent weight is
- (1) $2W$
 - (2) $\frac{W}{2}$
 - (3) \sqrt{W}
 - (4) $\sqrt{2W}$
71. An isotope of chlorine has the mass number 37. Other isotopes of chlorine will have the same
- (1) Atomic weight
 - (2) Atomic volume
 - (3) Number of electrons
 - (4) Number of protons
72. The electronic arrangement $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$ corresponds to
- (1) Cu
 - (2) K
 - (3) Ca
 - (4) Mg
73. The atomic number of an element is 20. Its valency is
- (1) 1
 - (2) 2
 - (3) 3
 - (4) 4

74. Two elements X and Y have electronic configuration as 2, 8, 2 and 2, 8, 7 respectively. They react to form an ionic compound whose formula is
- (1) XY (2) X_2Y_3
(3) XY_2 (4) X_2Y
75. Variable valency is exhibited by elements with incomplete
- (1) s level
(2) p level
(3) d level
(4) any one of the above levels
76. Which of the following is a cation ?
- (1) Na^+ (2) Cl^-
(3) NaOH (4) Ca
77. An acid is
- (1) An electron pair acceptor
(2) An electron pair donor
(3) An electron pair acceptor and donor
(4) Dissociated into ions
78. The maximum number of electrons in 'f' orbital is
- (1) 2 (2) 14
(3) 32 (4) 8
79. A Galvanic cell converts
- (1) chemical energy into electrical energy
(2) electrical energy into chemical energy
(3) electrical energy into heat energy
(4) chemical energy into heat energy
80. Which among the following represents the most stable electronic configuration ?
- (1) $1s^2 2s^2 2p^6 3s^2 3p^5$
(2) $1s^2 2s^2 2p^6 3s^1$
(3) $1s^2 2s^2 2p^6$
(4) $1s^2 2s^2 2p^6 3s^2$

TEST IV
GENERAL AWARENESS AND
COMMUNICATION SKILLS

- 81.** The Supreme Court of India is located at
- (1) Mumbai
 - (2) Kolkata
 - (3) Chennai
 - (4) New Delhi
- 82.** Sound is measured in
- (1) Crucible
 - (2) Decibel
 - (3) Henry
 - (4) Hertz
- 83.** Ravana was the son of
- (1) Visherva Rishi
 - (2) Valmiki Rishi
 - (3) Bhrigu Rishi
 - (4) None of the above
- 84.** How many state boundaries does Madhya Pradesh touch ?
- (1) Four
 - (2) Five
 - (3) Six
 - (4) Seven
- 85.** Glowing Filament is found in
- (1) Tubelight
 - (2) Bulbs
 - (3) CFL
 - (4) Fan
- 86.** Mirage occurs in
- (1) Hot places
 - (2) Arctic region
 - (3) Sunderbans
 - (4) Polar region

87. Capital of Mizoram is

- | | |
|------------|--------------|
| (1) Aizawl | (2) Imphal |
| (3) Kohima | (4) Shillong |

88. AIDS occurs due to

- (1) Eating with an infected person
- (2) Blood transfusion
- (3) Touching an infected person
- (4) None of the above

89. Which of the following is mismatched ?

- | | | |
|--------------------|---|-----------------|
| (1) Madhubani | — | Paintings |
| (2) Chittaranjan | — | Railway coaches |
| (3) Sword | — | Scabbard |
| (4) Doppler effect | — | Sound |

90. Hygrometer is used to measure

- | | |
|-----------------|-----------------------|
| (1) Temperature | (2) Humidity |
| (3) Pressure | (4) Salinity of water |

Directions : In questions no. 91, 92, 93 and 94, fill in the blanks with appropriate words so as to complete the sentence in the best possible manner.

91. I went to _____ my friend.

- | | |
|--------------|---------------|
| (1) look up | (2) put up |
| (3) throw in | (4) clean out |

92. She asked him who _____ was ?

- | | |
|----------|---------|
| (1) she | (2) he |
| (3) they | (4) you |

93. All that glitters _____ not gold.

- | | |
|--------------|--------------|
| (1) was | (2) is |
| (3) has been | (4) had been |

94. Hard work is the _____ to success.

- | | |
|----------|-----------|
| (1) road | (2) key |
| (3) way | (4) block |

Directions : For questions no. 95, 96 and 97, state the choice closest in meaning to the given word (synonym).

95. PROFILE

- (1) Outline
- (2) Inline
- (3) Crossline
- (4) Byline

96. LINEN

- (1) Cloth
- (2) Curtain
- (3) Bedsheet
- (4) Dress

97. DUMP

- (1) Heap
- (2) Lot
- (3) Collection
- (4) Group

Directions : For questions no. 98, 99 and 100, select the choice which is closest to the opposite in meaning of the given word (antonym).

98. PESSIMIST

- (1) Chemist
- (2) Optimist
- (3) Columnist
- (4) Communist

99. BOON

- (1) Curse
- (2) Bane
- (3) Pain
- (4) Unboon

100. ZENITH

- (1) Nadir
- (2) Top
- (3) Bottom
- (4) Mandir

SPACE FOR ROUGH WORK