JEE EXPERT

SAMPLE PAPER

SCIENCE
Going to X

Time : 2 Hours

Maximum Marks : 180

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

INSTRUCTIONS

(i) The question paper has 10 printed pages excluding Answer Sheet. Please ensure that the copy of the question paper you have received contains all pages.

(ii) The question paper contains 60 questions. Each question carry 3 marks and all the questions are compulsory. *There is negative marking. One mark will be deducted for each wrong answer. No mark will be deducted for unattempted question.*

(iii) Each question contains Four alternatives out of which only **ONE** is correct.

(iv) Indicate the correct answer for each question by filling appropriate bubble in your answer sheet.

(v) For rough work, use the space provided in question paper booklet. No extra sheet will be provided for rough work.

(vi) Use of Calculator, Log Table, Slide Rule and Mobile is not allowed.

(vii) The answer(s) of the questions must be marked by shading the circles against the question by dark pencil only. For example if only 'B' choice is correct then,

the correct method for filling the bubble is

A ◯   B ●   C ◯   D ◯

the wrong method for filling the bubble are

(a)   A ◯   B ⊘   C ◯   D ◯

(b)   A ◯   B ⊗   C ◯   D ◯

(c)   A ◯   B ◉   C ◯   D ◯

The answer of the questions in wrong or any other manner will be treated as wrong.

Name of the candidate

Regn. Number

I have read all the instructions and shall abide by them.

....
Signature of the Candidate

I have verified all the information filled in by the candidate.

....
Signature of the invigilator

Physics

SECTION – I

Straight Objective Type

This section contains 20 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. A stone is dropped under gravity from rest from a height h and it travels a distance $\dfrac{9h}{25}$ in the last second. The height h is : ($g = 10$ m/s^2).
   (A) 140 m   (B) 125 m   (C) 150 m   (D) 100 m

2. From the v–t graph, the :
   (A) Speed at $t = 1$s is 1.2 m/s
   (B) Acceleration is 2 m/s^2
   (C) Average speed during 1st second is 1.5 m/s
   (D) Speed of particle can be zero.

3. A car applies its brakes when its speed is V_0. It stops after covering a distance x with a constant deceleration a. The average velocity of the car over a time interval between its application of brakes and stop is :
   (A) $\dfrac{V_0}{2}$ (B) $\sqrt{\dfrac{ax}{2}}$ (C) $\dfrac{3V_0}{2}$ (D) $\sqrt{2ax}$

4. A force of 25 N acts on a mass of 10 kg which forces the mass to execute uniform circular motion of radius 10 m. The speed of the mass is :
   (A) 2.5 m/s   (B) 5 m/s   (C) 3 m/s   (D) 4 m/s

Space For Rough Work

5. A body starts from rest with uniform acceleration. If it gains kinetic energy k_0 during time t_0, its kinetic energy at any instant t is :

(A) $k_0 \dfrac{t}{t_0}$ (B) $k_0 \dfrac{t^2}{t_0^2}$ (C) $k_0 t^2$ (D) $k_0 \dfrac{t_0^2}{t^2}$

6. The work done by gravity of earth on an orbiting artificial satellite moving in circular orbit is :
(A) zero   (B) + ve for sometime
(C) – ve   (D) always positive

7. A body is projected with a kinetic energy k_0. If its kinetic energy is decreased by 25%, the work done by the forces acting on it, is :

(A) $\dfrac{3}{4} k_0$ (B) $-\dfrac{1}{4} k_0$ (C) $\dfrac{1}{4} k_0$ (D) $-\dfrac{3}{4} k_0$

8. A Lift is moving up with some retardation. The apparent weight of a person inside the lift is :
(A) Less than actual weight   (B) Greater than actual weight
(C) Zero   (D) Equal to actual weight

9. If the earth is squeezed gravitationally to half of its present radius, the duration of the day will be :

(A) 12 hrs   (B) 6 hrs   (C) 42 minutes   (D) None of these

10. Two pieces of metal when immersed in a liquid have equal upthrust on them, then :
(A) Both pieces must have equal weights
(B) Both pieces must have equal densities
(C) Both pieces must have equal volumes
(D) Both are floating to the same depth.

11. Two solids A and B float in a liquid. It is observed that A floats with half its volume immersed and B floats with $\dfrac{2}{3}$ of its volume immersed. What is the ratio between the densities of A and B :

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

Space For Rough Work

12. Pressure at the bottom of tank of water is 3P, where P is atmospheric pressure. If the water is drain out till the level of water is lowered by $\frac{1}{5}$th, then the pressure at the bottom of the tank is :

(A) 2P (B) $\frac{13P}{5}$ (C) $\frac{8P}{5}$ (D) $\frac{4P}{5}$

13. A body of mass 120 kg and density 600 kg/m^3 floats in water. What additional mass could be added to the body so that the body will just sink :
(A) 20 kg (B) 80 kg (C) 100 kg (D) 120 kg

14. A big explosion on the moon can not be heard on the earth because :
(A) The explosion produces high frequency sound waves which are inaudible
(B) Sound waves required a material medium for propagation
(C) Sound waves are absorbed in the atmosphere of moon
(D) Sound waves are absorbed in earth's atmosphere.

15. Mechanical waves in a gas are :
(A) Transverse (B) Longitudinal
(C) Neither transverse nor longitudinal (D) Either transverse or longitudinal

16. A boat at anchor is rocked by waves whose crests are 100 m apart and whose velocity is 25 m/s. These waves strike the boat once every :
(A) 2500 sec (B) 0.25 sec (C) 1500 sec (D) 4 sec

17. The loudness of sound depends upon :
(A) Amplitude (B) Pitch (C) Velocity (D) Wavelength

18. When sound waves travel from air into water, which of these remains constant ?
(A) Velocity (B) Frequency (C) Wavelength (D) All of these

19. The velocity of sound is not affected by change in :
(A) Temperature (B) Medium (C) Pressure (D) Wavelength

20. An engine approaches a hill with a constant speed. When it is at a distance of 0.9 km it blows a whistle, whose echo is heard by the driver after 5 second. The speed of the engine is (speed of sound in air is 330 m/s) :
(A) 25 m/s (B) 30 m/s (C) 20 m/s (D) 15 m/s

Space For Rough Work

Chemistry

SECTION – II

Straight Objective Type

This section contains 20 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

21. The number of molecules present in 8 g of oxygen gas are
    (A) 6.022×10^{23} (B) 3.011×10^{23} (C) 12.044×10^{23} (D) 1.505×10^{23}

22. What happens when a saturated solution is cooled ?

    (A) It becomes unsaturated   (B) It remains unaffected

    (C) It becomes supersaturated   (D) It becomes transparent

23. The largest number of molecules are in
    (A) 54 g of nitrogen pentoxide   (B) 28 g of carbon dioxide
    (C) 36 g of water   (D) 46 g of ethyl alcohol

24. The number of moles of H_2 in 0.224 litres of hydrogen gas at STP (273 K, 1 atm) (assuming ideal gas behaviour) is
    (A) 1   (B) 0.1   (C) 0.01   (D) 0.001

25. The smell of perfume spreads out by a process known as
    (A) evaporation   (B) diffusion   (C) condensation   (D) fusion

26. Which of the following contains maximum number of atoms?
    (A) 6.023×10^{21} molecules of CO_2 (B) 22.4 L of CO_2 at STP
    (C) 0.44 g of CO_2 (D) none of these

27. Which of the following will show "Tyndall effect" ?

    (A) Salt solution   (B) Sugar solution

    (C) Soap solution   (D) Copper sulphate solution

28. Anode rays
    (A) are deflected by electric and magnetic field
    (B) have constant e/m ratio for every gas
    (C) travel from cathode to anode
    (D) all of these

Space For Rough Work

29. The substances that sublime can be made to liquefy by :
   (A) heating them under pressure
   (B) heating them at low pressure
   (C) Cooling them under pressure
   (D) Cooling them at low pressure

30. Chromatography is the technique which is used for separation of those solutes that :
   (A) dissolve in the same solvent
   (B) get adorbed to different extremes
   (C) get adorbed at the same speed
   (D) are soluble in aqueous medium

31. The number of atoms in 4.25 g of NH_3 in approximately
   (A) 1×10^{23}
   (B) 2×10^{23}
   (C) 4×10^{23}
   (D) 6×10^{23}

32. Conversion of 700 K into °C is
   (A) 427°C
   (B) 472°C
   (C) 274 K
   (D) 973 K

33. For an Aerosol colloid select incorrect option
   (A) Dispersed phase is liquid
   (B) Fog comes under Aerosol category
   (C) Pumice stone comes under aerosol category
   (D) Dispersion phase is liquid

34. The Bohr's model could successfully explain
   (A) the stability of the atom
   (B) the atomic spectra of hydrogen atom
   (C) The calculation of energy of the electron in a particular orbit of hydrogen atom
   (D) all the above

Space For Rough Work

35. An alpha particle is also known as
(A) Sub−atomic particle
(B) an unionized helium atom
(C) a neutral particle
(D) a doubly−charged helium ion

36. The number of valence electrons in Cl^- ion are
(A) 7
(B) 8
(C) 1
(D) 6

37. What do the species ^3_1A and ^3_2B represent?
(A) isobars
(B) isotopes
(C) isotones
(D) isomers

38. According to Bohr−Bury scheme, the maximum number of electrons which can be accommodated in a given shell is given by the formula:
(A) $2n^2$
(B) n^2
(C) $3n^2$
(D) $2n$

39. The valency of copper in $CuSO_4. 5H_2O$ is
(A) +1
(B) +3
(C) +2
(D) 0

40. Pick the correct sentence from the following
(A) A mixture has a fixed melting point and boiling point
(B) A compound is formed by the combination of two or more elements in a definite ratio by mass
(C) A mixture is always heterogeneous
(D) A compound does not have a fixed melting point

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space for Rough work

Mathematics
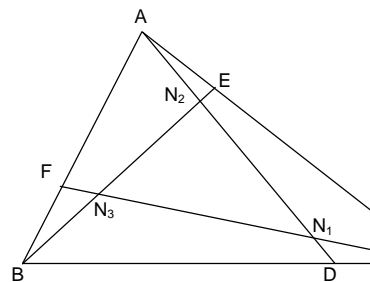
SECTION – III

Straight Objective Type

This section contains 20 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

41. The least value of the expression ax^2+bx+c, $(a>0)$ is:

    (A) $-\dfrac{b}{a}$
    (B) $-\dfrac{b}{2a}$
    (C) b^2-4ac
    (D) $\dfrac{4ac - b^2}{4a}$

42. A rectangle inscribe in a triangle has its base coinciding with the base "b" of the triangle. If the altitude of the triangle is "h" and the altitude "x" of the rectangle is half the base of the rectangle, then

    (A) $x = \dfrac{h}{2}$
    (B) $x = \dfrac{bh}{h+b}$
    (C) $x = \dfrac{bh}{2h+b}$
    (D) $x = \sqrt{\dfrac{hb}{2}}$

43. The equation $x + \sqrt{x-2} = 4$ has:
    (A) 2 real roots
    (B) 1 real and 1 imaginary root
    (C) 1 real root
    (D) 2 imaginary roots

44. A points is selected at random inside an equilateral triangle. From this point perpendiculars are dropped to each side. The sum of these perpendiculars is:
    (A) least when the point is the centre of gravity of the triangle
    (B) greater than the altitude of the triangle
    (C) equal to the altitude of the triangle
    (D) greatest when the point is the centre of gravity

45. Of the following sets of data the only one that does not determine the shape of a triangle is:
    (A) the ratio of two sides and the included angle
    (B) the ratio of the three altitudes
    (C) the ratios of the three medians
    (D) the ratio of the altitude to the corresponding base

46. If $\dfrac{xy}{x+y} = a, \dfrac{xz}{x+z} = b$ and $\dfrac{yz}{y+z} = c$, where a, b, and c are other than zero, then x equals:

    (A) $\dfrac{abc}{ab+ac+bc}$
    (B) $\dfrac{2abc}{ab+bc+ac}$
    (C) $\dfrac{2abc}{ab+ac-ac}$
    (D) $\dfrac{2abc}{ac+bc-ab}$
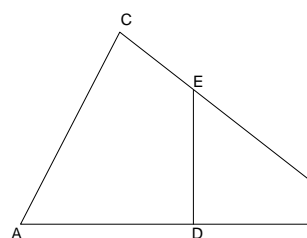
Space For Rough Work

7. In the figure $\overline{CD}, \overline{AE}$ and $\overline{BF}$ are non-third of their respective sides. It follows that $\overline{AN_2} : \overline{N_2N_1} : \overline{N_1D} = 3:3:1$, and similarly for lines BE and CF. Then the area of triangle $N_1N_2N_3$ is:

(A) $\dfrac{1}{10}\Delta ABC$ (B) $\dfrac{1}{9}\Delta ABC$

(C) $\dfrac{1}{7}\Delta ABC$ (D)

$\dfrac{1}{6}\Delta ABC$

8. In the figure, it is given that angle C=90°, $\overline{AD} = \overline{DB}$, DE $\perp$ AB, $\overline{AB} = 20$ and $\overline{AC} = 12$. The area of quadrilateral ADEC is:

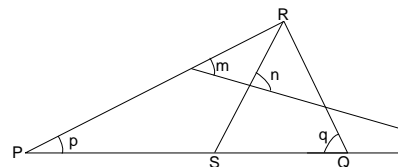(A) 75   (B) $58\dfrac{1}{2}$

(C) 48   (D) $37\dfrac{1}{2}$

49. If $y = x + \dfrac{1}{x}$ then $x^4+x^3-4x^2+x+1=0$ becomes:

(A) $x^2(y^2+y-2)=0$ (B) $x^2(y^2+y-3)=0$ (C) $x^2(y^2+y-4)=0$ (D) $x^2(y^2+y-6)=0$

0. Given triangle PQR with RS bisecting angle R, PQ extended to D and angle n a right angle, then:
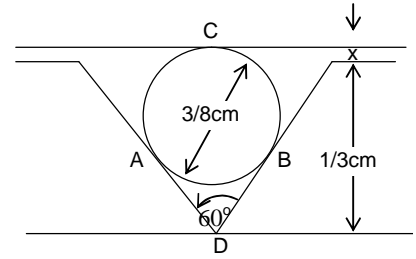
(A) $\angle m = \dfrac{1}{2}(\angle p - \angle q)$ (B) $\angle m = \dfrac{1}{2}(\angle p + \angle q)$

(C) $\angle d = \dfrac{1}{2}(\angle q + \angle p)$ (D) $\angle d = \dfrac{1}{2}\angle m$
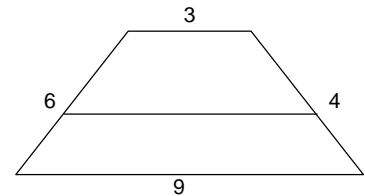

Space For Rough Work

1. In the diagram if points A, B, C are points of tangency, then x equals:

(A) $\dfrac{3}{16}$ cm

(B) $\dfrac{1}{16}$ cm

(C) $\dfrac{11}{48}$ cm
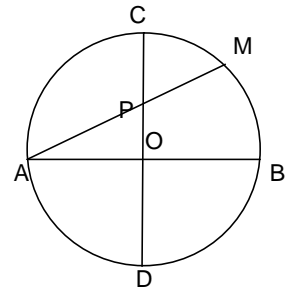
(D) $\dfrac{3}{32}$ cm

2. The parallel sides of a trapezoid are 3 and 9. The non-parallel sides are 4 and 6. A line parallel to the bases divides the trapezoid into two trapezoids of equal perimeters. The ratio in which each of the non-parallel sides is divided is:
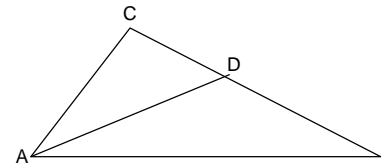
(A) 4:3

(B) 3:2

(C) 4:1

(D) 3:1

3. "O" is centre of the circle having diameters AB and CD perpendicular to each other. AM is any chord intersecting CD at P. Then $\overline{AP} \cdot \overline{AM}$ is equal to:

(A) $\overline{AO} \cdot \overline{OB}$

(B) $\overline{AO} \cdot \overline{AB}$

(C) $\overline{CP} \cdot \overline{CD}$

(D) $\overline{CP} \cdot \overline{PD}$

4. In triangle ABC, $\overline{AC} = \overline{CD}$ and $\angle CAB - \angle ABC = 30°$. Then $\angle BAD$ is
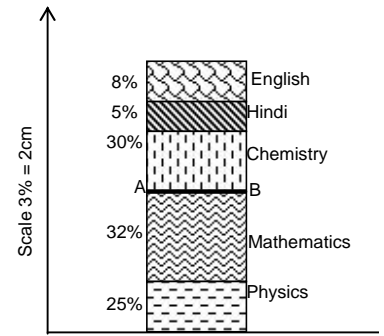
(A) 30°

(B) 20°

(C) 15°

(D) 10°

55. If $P = \dfrac{s}{(1+k)^n}$ then n equals:

(A) $\dfrac{\log(s/P)}{\log(1+k)}$

(B) $\log \dfrac{s}{P(1+k)}$

(C) $\log \dfrac{s-P}{1+k}$
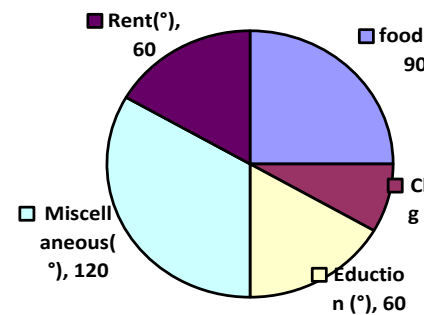
(D) $\dfrac{\log s}{\log P(1+k)}$

Space For Rough Work

56. If a>b & c>d, then which of the following is true?
   (A) ad+bc < ac+bd   (B) ac > bd   (C) ac > bd, if bd>0   (D) a – c > b – d

7. The given component bar diagram shows percentage of marks obtained by a student in different subjects in a test: The height of the line AB from x-axis is
   (A)   21 cm approx   (B)   38 cm
      (C) 86 cm approx.   (D)   48 cm

8. A family spends Rs.6000/- p.m. to meet the monthly expenditure. The expenditure has been shown in the given pie diagram. The miscellaneous expenditure (in Rs.) is
   (A)   2000   (B)   1500
      (C)   1200(D)
      3000

59. If two rectangular sheets each of dimensions (x, 2) and (y, 2) form the curved surfaces of two different cylinders, then the ratio between quotient of the volumes $\left(\dfrac{V_1}{V_2}\right)$ and quotient of the area of the curved surfaces $\left(\dfrac{S_1}{S_2}\right)$ of the two cylinders is

   (A) $\dfrac{x^2}{y}:1$ or $\dfrac{y^2}{x}:1$ (B) $\dfrac{2x}{y}:1$ or $\dfrac{2y}{x}:1$ (C) $\dfrac{3x}{y}:1$ or $\dfrac{3y}{x}:1$ (D) $\dfrac{x}{y}:1$ or $\dfrac{y}{x}:1$

60. The value of $\left(\dfrac{x^q}{x^r}\right)^{\frac{1}{qr}} \times \left(\dfrac{x^r}{x^p}\right)^{\frac{1}{rp}} \times \left(\dfrac{x^p}{x^q}\right)^{\frac{1}{pq}}$ is equal to

   (A) $x^{\frac{1}{p}+\frac{1}{q}+\frac{1}{r}}$ (B) 0   (C) $x^{pq+qr+rp}$ (D) 1

Space For Rough Work

JEE EXPERT

Going - X
SAT [20.01.2019]
ANSWERS

Physics

1.	B	2.	C	3.	A	4.	B
5.	B	6.	A	7.	B	8.	A
9.	B	10.	C	11.	C	12.	B
13.	B	14.	B	15.	B	16.	D
17.	A	18.	B	19.	C	20.	B

Chemistry

21.	D	22.	C	23.	C	24.	C
25.	B	26.	B	27.	C	28.	A
29.	A	30.	A	31.	D	32.	A
33.	C	34.	D	35.	D	36.	B
37.	A	38.	A	39.	C	40.	B

Mathematics

41.	D	42.	C	43.	C	44.	C
45.	D	46.	D	47.	C	48.	B
49.	D	50.	B	51.	C	52.	C
53.	B	54.	C	55.	A	56.	A
57.	B	58.	A	59.	D	60.	D