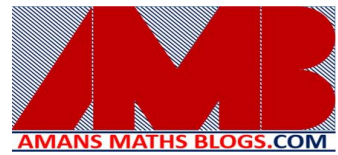
INDIAN ASSOCIATION OF PHYSICS TEACHERS
NATIONAL STANDARD EXAMINATION IN JUNIOR SCIENCE 2008 - 2009

Date of examination: 23rd November 2008

Time 16.15 to 17.15 Hrs.

Instructions to Candidates **www.AmansMathsBlogs.com**

1. In addition to this question paper, you are given a separate answer sheet.
2. On the answer sheet fill up all the entries carefully in the space provided, **ONLY IN BLOCK CAPITALS.**
   Incomplete / incorrect / carelessly filled information may disqualify your candidature.
3. On the answer sheet, use only **BLUE or BLACK BALL PEN** for making entries and marking answers.
4. This paper has two part. In part A1 (Q. Nos. 1 to 30) each question has **FOUR** alternatives, out of which only **one** is correct. Choose the correct alternative and mark a cross **(X)** in the corresponding box on the answer sheet.



For example,

Q.No.	a	b	c	d
22		X		

Part A2 (Q. Nos. 31 to 40) has four alternatives in each question, but any number of these (4, 3, 2, or 1) may be correct. You have to mark **ALL** correct alternatives and mark a cross **(X)** for each, like

Q.No.	a	b	c	d
42		X		X

5. Any rough work should be done only on the sheet provided at the end of question paper.
6. **For Part A1,** each correct answer gets 3 marks; wrong answer gets a penaltyof 1 mark. **For Part A2** full marks are 6 for each question, you get them when **ALL** correct answers only are marked.
7. Use of nonprogrammable calculator is allowed.
8. No candidate should leave the examination hall before the completion of the examination.
9. The answers / solutions of this question paper will be available on our website - **www.iapt.org.in** by 30 th November 2008.
10. Result sheets and the "centre top 10%" certificates of NSEA are dispatched to the Professor in charge of the centre. Thus you will get your marks from the Professor in charge of your centre by January 2009 end.
11. TOP 300 (or so) students are called for the next examination-Indian National Astronomy Olympiads (INAO). Individual letters are sent to these students ONLY.
12. No querries will be entertained in this regard.

PLEASE DO NOT MAKE ANY MARK OTHER THAN (X) IN THE SPACE PROVIDED ON THE ANSWER SHEET.

Answer sheets are evaluated with the help of a machine. Due to this, **CHANGE OF ENTRY IS NOT ALLOWED.**

Scratching or overwriting may result in wrong score.

DO NOT WRITE ANYTHING ON BACK SIDE OF ANSWER SHEET.

CERTIFICATES & AWARDS

Following certificates are awarded by the I.A.P.T. to students successful in NSEA.
i) Certificate for "Centre Top 10%" students.
ii) Merit certificates to statewise Top 1% students.
iii) Merit certificate and a prize in the form of a book to Nationwise Top 1% students.

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2008 – 2009

Total time: 60 minutes (A-1, A-2) **Marks: 150**

PART A – 1: ONLY ONE OUT OF FOUR OPTIONS IS CORRECT

1) Vernier callipers has 20 divisions on its vernier scale which coincide with 19 divisions on the main scale. Least count of the instrument is 0.1 mm. The main scale division is

(a) 0.5 mm
(b) 1 mm
(c) 2 mm
(d) 0.25 mm

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2) L, M and N are mid points of sides AB, BC and CA of triangle ABC. If area of triangle ABC is 48 units, the area of triangle LMN will be

(a) 6 units
(b) 8 units
(c) 12 units
(d) 24 units

3) The expression $(1 - \tan A + \sec A)(1 - \cot A + \operatorname{cosec} A)$ has value

(a) – 1
(b) 0
(c) + 1
(d) + 2

4) When a sample of copper with impurity of zinc is to be purified by electrolysis, the appropriate electrodes are

	cathode	*anode*
(a)	pure zinc	pure copper
(b)	impure sample	pure copper
(c)	impure zinc	impure sample
(d)	pure copper	impure sample

5) On mixing certain alkane with chlorine and irradiating with ultraviolet light, it forms only one monochloroalkane. This alkane could be

(a) propane
(b) pentane
(c) isopentane
(d) neopentane

6) Podocytes are exclusively located in

(a) liver
(b) heart
(c) kidney
(d) spleen

7) Testes descend down the scrotum through

(a) obturator canal
(b) inguinal canal
(c) vertebral canal
(d) vertebra arterial canal

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8) Pteridophytes are characterized by _____ venation in their leaves.

(a) multicostate, reticulate divergent.
(b) unicostate, parallel
(c) forked
(d) unicostate, reticulate

9) The depth of ocean at any place can be measured (estimated) with the help of

(a) X rays
(b) ultrasonic waves
(c) radio waves
(d) ultraviolet rays

10) A certain force acting on a body of mass 2 kg increases its velocity from 6 m/s to 15 m/s in 2 s. The work done by the force during this interval is

(a) 27 J
(b) 3 J
(c) 94.5 J
(d) 189 J

11) A person on the top of a tower observes a scooter moving with uniform velocity towards the base of the tower. He finds that the angle of depression changes from 30^0 to 60^0 in 18 minutes. The scooter will reach the base of the tower in next

(a) 9 minutes
(b) $18/(\sqrt{3}-1)$ minutes
(c) $6\sqrt{3}$ minutes
(d) the time depends upon the height of the tower

12) Among the following factors the most important in making fluorine the strongest oxidizing agent is

(a) electron affinity
(b) ionization energy
(c) hydration enthalpy
(d) bond dissociation energy

13) The ratio of amounts of H_2S needed to precipitate all the metal ions from 100 ml of 1 M $AgNO_3$ and 100 ml of 1 M $CuSO_4$ will be

(a) 1 : 2
(b) 2 : 1
(c) 1 : 1
(d) indefinite

14) 6.02×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of urea solution is

(a) 0.001 M
(b) 0.01 M
(c) 0.02 M
(d) 0.1 M

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15) P, Q and R are three natural numbers such that P and Q are primes and Q divides PR. Then out of the following the correct statement is

(a) Q divides R
(b) P divides R
(c) P divides QR
(d) R divides PQ

16) An image of the size same as that of the object CANNOT be produced by

(a) a plane mirror
(b) a concave mirror
(c) a convex mirror
(d) a convex lens

17) Out of the following statements the one that is NOT true in case of lines of magnetic induction is

(a) these lines are closed curves
(b) they cannot be parallel
(c) these lines indicate the direction of magnetic field at a point
(d) these lines indicate the strength of magnetic field at a point

18) A cylinder of radius 6 cm and height h cm is filled with ice cream. The ice cream is then distributed among 10 children in identical cones having hemispherical tops. The radius of the base of the cone is 3 cm and its height is 12 cm. Then the height h of the cylinder must be

(a) 100/7 cm
(b) 18 cm
(c) 15 cm
(d) 200/11 cm

19) The number of isosceles triangles with integer sides such that no side is greater than 4 units is

(a) 8
(b) 9
(c) 16
(d) 12

20) A red solid is insoluble in water. However it becomes soluble if some KI is added to water. Heating the red solid in a test tube results in liberation of some violet coloured fumes and droplets of metal appear on the cooler parts of the test tube. The red solid is

(a) $(NH_4)_2\ Cr_2O_7$
(b) HgI_2
(c) HgO
(d) Pb_3O_4

21) Out of the following the one that undergoes reaction with 50% NaOH solution to give corresponding alcohol and acid is

(a) phenol
(b) benzaldehyde
(c) butanol
(d) benzoic acid

22) Ripened follicle in the ovary is called

(a) corpus albicans
(b) corpus luteum
(c) mature follicle
(d) Graafian follicle

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23) Lateral meristem includes

(a) fascicular cambium and core cambium
(b) phellogen and protoderm
(c) procambium and interfascicular cambium
(d) dermatogen and ground meristem

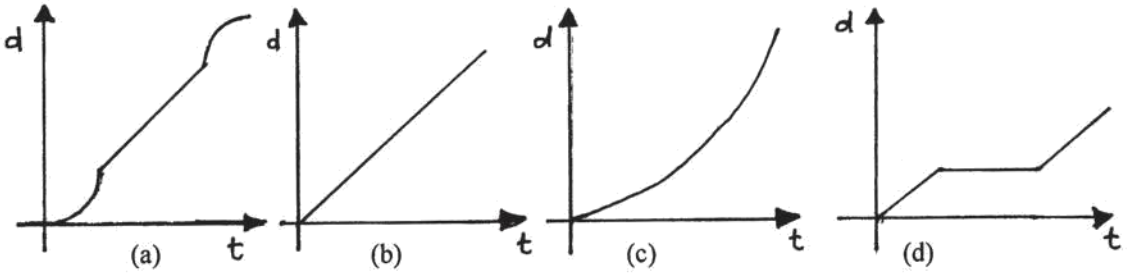
24) When a cell is fully turgid, which of the following will be zero?

(a) turger pressure
(b) wall pressure
(c) suction pressure
(d) osmotic pressure

25) A ray of light is incident at an angle α on the boundary separating two transparent media. It is transmitted. When angle α is increased very slightly (by negligible amount), the ray suffers a total internal reflection. The difference between the angles of deviation in two cases is

(a) 2α
(b) $90^0 - \alpha$
(c) $180^0 - \alpha$
(d) $180^0 - 2\alpha$

26) A car starts from point A, travels on a straight road and stops at its destination B. The distance – time graph of this journey has the nature



27) Occurrence of tall and dwarf plants in the F_2 generation of pea plant indicates that

(a) both the traits were present in the parent plant
(b) both the traits were present in the F_1 plant
(c) tall is dominant over dwarf
(d) tall and dwarf traits have equal effect in expression

28) Thebecian valve is present

(a) in between left atrium and left ventricle
(b) in between right atrium and right ventricle
(c) at the base of superior vena cava
(d) at the base of inferior vena cava

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29) Among the following mixtures, dipole-dipole as the major interaction is present in

(a) benzene and ethanol
(b) acetonitrile and acetone
(c) KCl and water
(d) benzene and carbon tetrachloride

30) A man throws a ball making an angle of 60^0 with the horizontal. He runs on a level ground and catches the ball. If he had thrown the ball with speed v, then his speed must be

(a) v
(b) $v/2$
(c) $2v$
(d) $\sqrt{v}$

PART A - 2

In question 31 to 40 any number of options (1 or 2 or 3 or all 4) may be correct. You are to identify all of them correctly to get 6 marks. Even if one answer identified is incorrect or one correct answer is missed, you get zero score.

31) The basic event in evolution is

(a) change in DNA
(b) change in habitat
(c) change in nature of food
(d) change in climate

32) The metal/s that would liberate hydrogen on reaction with dilute hydrochloric acid is/are

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(a) zinc
(b) copper
(c) silver
(d) magnesium

33) There are four resistors of 12 ohm each. Which of the following values is/are possible by their combinations (series and/or parallel)?

(a) 9 ohm
(b) 16 ohm
(c) 12 ohm
(d) 30 ohm

34) A body floats on water and also on an oil of specific gravity 0.8. Which of the following is/are true?

(a) Body loses less weight in oil than in water.
(b) Volume of water displaced is 0.8 times that in oil.
(c) It experiences equal upthrust from water and oil.
(d) For the body to just sink, 0.8 times of extra load is required in water than in oil.

35) If p, q and r are positive real numbers, then the quantity $(p + r)/(q + r)$ is

(a) $> (p/q)$ if $p > q$
(b) $< (p/q)$ if $p > q$
(c) $> (p/q)$ if $p < q$
(d) $< (p/q)$ if $p < q$

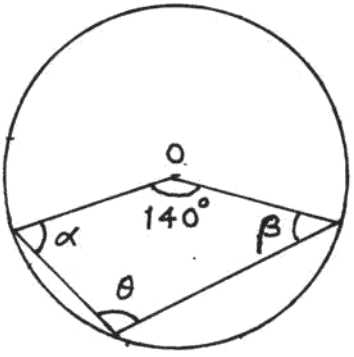
36) Medulla oblongata of the brain contains

(a) cadiac centre
(b) respiratory centre
(c) vaso-constriction centre
(d) thirst centre

37) The expression $(5a-3b)^3+(3b-7c)^3-(5a-7c)^3$ is divisible by

(a) $(5a+3b+7c)$
(b) $(5a-3b-7c)$
(c) $(3b-7c)$
(d) $(7c-5a)$

38) In the figure shown



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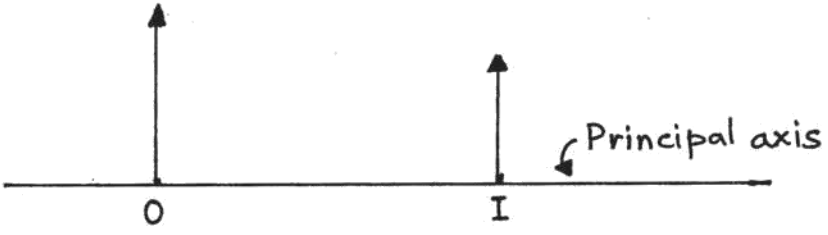
(a) $\alpha+\beta=110^0$
(b) $\alpha=\beta=55^0$
(c) $\theta=110^0$
(d) $\theta=140^0$

39) The figure shows positions of object O and its diminished image I. This is possible if



(a) a convex mirror is placed to the right of I
(b) a convex mirror is placed between O and I
(c) a concave lens is placed to the right of I
(d) a concave lens is placed between O and I

40) A carboxylic acid will evolve CO_2 when reacted with

(a) $NaHCO_3$
(b) HCl
(c) $NaHSO_3$
(d) Na_2CO_3