VIGNAN'S
Foundation for Science, Technology & Research
(Deemed to be UNIVERSITY)
Estd. u/s 3 of UGC Act 1956

V-SAT 18

VIGNAN'S SCHOLASTIC APTITUDE TEST

This booklet contains 14 printed pages

PAPER -1: BIOLOGY, PHYSICS, CHEMISTRY, & ENGLISH / APTITUDE

Read carefully the following Instructions before opening the seal of this booklet.
Do not open this Test Booklet untill you are instructed by the invigilator.

BOOKLET

CODE **E**

SERIAL NO.

Important Instructions:

1. Immediately fill in the particulars at the bottom of this test booklet with blue/black ball point pen. Use of pencil is strictly prohibited.
2. A separate OMR answer sheet is provided along with this test booklet. When you are directed to open the test booklet, take the OMR answer sheet and fill in the required particulars carefully.
3. The CODE for this booklet is **E**. Make sure that the CODE on the OMR Answer Sheet should be marked as that on this booklet.
4. Immediately on opening the booklet, please check for (i) the same booklet code (A/B/C/D/E) on the top of each page (ii) serial number of the questions (1-60) (iii) the number of pages (iv) correct printing.
5. The test is of **1 hour 30 minutes** duration.
6. The test consists of 60 Questions. The maximum marks are 60.
7. There are 4 sections in the question paper. Each question carries 1 mark for correct answer and there is no negative marking for incorrect answer.
   Section I - BIOLOGY (15 Marks) consists of 15 questions (1 to 15).
   Section II - PHYSICS (15 Marks) consists of 15 questions (16 to 30).
   Section III - CHEMISTRY (15 Marks) consists of 15 questions (31 to 45).
   Section IV - ENGLISH / APTITUDE (15 Marks) consists of 15 questions (46 to 60).
8. Candidates will be awarded marks as stated in instruction No.6 for correct response to each question. Marks will not be awared for unattempted / unmarked questions on the answer sheet.
9. No candidate is allowed to carry any textual material,printed or written, bits of papers, blank papers, mobile phone, any electronic device, etc., except the hall ticket, ball point pen, HB pencil, eraser and sharpner inside the examination hall/room.
10. Rough work is to be done in the space provided at the bottom of each page, on page 2 in the test booklet only.
11. On completion of the test, the candidate must hand over the test booklet along with OMR answer sheet to the Invigilator in the room/hall.
12. Do not fold, mutilate or make any stray marks on the OMR answer sheet.

Name of the Candidate (in Capital Letters): _____

Parent's Mobile No. : ☐☐☐☐☐☐☐☐☐☐ Jr.Inter Marks ☐

School/Coching Centre Name : _____

Residence Address : _____

_____

State : _____ Pin Code : ☐☐☐☐☐☐

Candidate's Signature : _____ Invigilator's Signature: _____

E

SPACE FOR ROUGH WORK

Rough Work

E

SECTION - I
BIOLOGY

1. Following is an international centre for plant identification [B]

   A. Indian Botanical Gardens-Kolkata B. Royal Botanical Gardens-Kew

   C. ICRISAT - Hyderabad D. Forest Research Institute- Dehradun

2. Bacterium that derive the carbon from CO_2 and enegry from the oxidation of inorganic substances

   A. Nitrosomonas B. Methanogens C. Chlorobium D. Both 1 and 2 [D]

3. The T-even bacteriophages have_____as their nuclear material

   A. Double stranded DNA B. Single srtanded DNA [A]

   C. Double stranded DNA D. Single stranded RNA

4. Site of protein synthesis is [C]

   A. Golgi complex B. Chloroplast C. Ribosome D. Mitochondrion

5. Phosphodiester bond connect [C]

   A. Sugar - N_2 base B. Sugar - Sugar C. Sugar - Phosphate D. Phosphate - Phosphate

6. Gymnosperms do not bear fruits because they [A]

   A. Do not have ovary B. Do not have pollination

   C. Are seedless plants D. Do not have mechanism of fertilization

7. Identify the correct sequence of events that occur during the sexual reproduction in Angiosperms

   A. Embryogenesis $\rightarrow$ Fertilisation $\rightarrow$ Gametogenesis $\rightarrow$ Pollination [C]

   B. Gametogenesis $\rightarrow$ Embryogenesis $\rightarrow$ Pollination $\rightarrow$ Fertilisation

   C. Gametogenesis $\rightarrow$ Pollination $\rightarrow$ Fertilisation $\rightarrow$ Embryogenesis

   D. Pollination $\rightarrow$ Gametogenesis $\rightarrow$ Fertilisation $\rightarrow$ Embryogenesis

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Rough Work

8. The correct statement from the following [D]

A. Stamens in Solamum have filaments with different lengths

B. Phylloclade is the modification of leaf

C. Cladophyll is modification of stem, which becomes succulent

D. Stem is modified into thron in Bougainvillea

9. Read the following statements about the aggregate fruit [B]

A. Developed from a single ovary B. Developed from a single flower

C. Developed from apocarpous gynoecium D. Developed from all the flower of an inflorescence

10. Which floral formula fits family Liliaceae? [D]

A. EBr, Ebrl, %, ♂, $K_{(5)}$, $C_{1+1+(2)}$, $A_{(9)+1}$, $\underline{G}_1$

B. Br, Brl, ⊕, ♂, $K_{(4)}$, $C_{(4)}$, A_4, $\overline{G}_{(2)}$

C. Br, ⊕, ♂, $K_{(5)}$, $C_{(5)}$, A_5, $\underline{G}_{(2)}$

D. Br, Ebrl, ⊕, ♂, P_{3+3}, A_{3-3}, $\underline{G}_{(3)}$

11. Choose the wrong statement from the following [A]

A. Polyploids never occur in nature but they can be produced artificially

B. Triticale is the result of intergeneric hybridization

C. New genotypes cannot be produced through clonal selection

D. IR-8 is an introduced rice variety

Rough Work

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12. Find out the incorrect statement regarding the triplet codon [B]

A. Code is degenerate B. Code is overlapping

C. Code has polarity D. Code is commaless

13. The characteristic feature of ptridophytes is [A]

A. Presence of ramenta on stem and leaves B. Presence of pollen tube

C. Presence of suspensor in embryo D. Aggregation of sporopphylls in cones

14. Identify wrong statement of the following [A]

A. Zoospores are produced by meiosis in chlamydomonas

B. Penicillium produces conidia on sporangiophores

C. Rhizopus produces asexual spores in sporangium

D. Gemmae are produced in liver wrots for asexual reproduction

15. Phylloclade is a modification of [D]

A. Leaf B. Root C. Flower D. Stem

Rough Work

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SECTION - II

PHYSICS

16. When a current of $(2.5 \pm 0.5)A$ flows through a wire, it develops a potential difference of $(20 \pm 1)V$. The resistance of the wire is [B]

A. $(8 \pm 1.5)\Omega$ B. $(8 \pm 2)\Omega$ C. $(8 \pm 3)\Omega$ D. $(8 \pm 1.6)\Omega$

17. A particle is projected with velocity u along the x-axis. The deceleration on the particle is proportional to the square of the distance from the origin as $a = \alpha x^2$, the distance at which the particle stop is

A. $\sqrt{\frac{3u}{2\alpha}}$ B. $\left(\frac{3u^2}{2\alpha}\right)^{1/3}$ C. $\left(\frac{3u}{2\alpha}\right)^{1/3}$ D. $\sqrt{\frac{2u^2}{3\alpha}}$ [B]

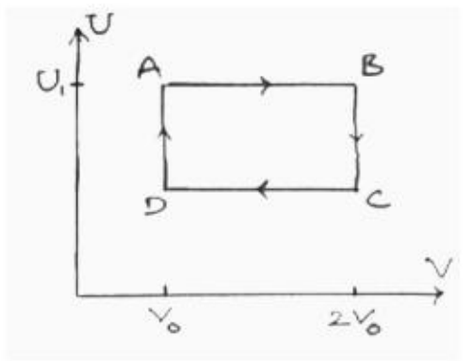
18. A stone is projected with a velocity $10\sqrt{2}m/s$ at an angle of 45^0 to the horizontal. The average velocity of stone during its motion from starting point to its maximum height is $(g = 10m/s^2)$

A. $10\sqrt{5}m/s$ B. $5\sqrt{5}m/s$ C. $20\sqrt{2}m/s$ D. $20m/s$ [B]

19. About $0.014kg$ of nitrogen gas is enclosed in a vessel at a temperature of $27^0 c$. The amount of heat to be transferred to the gas to double the r. m. s. speed of its molecules is ____ ($R=2$ *cal/mol k*)

A. 900 cal B. 4500 cal C. 2250 cal D. 450 cal [C]

20. One mole of an ideal gas has an internal energy given by $U = U_0 + 2PV$ where P is the pressure and V the volume of the gas. U_0 is a constant . This gas under goes the quasistatic cyclic process $ABCDA$ as shown in U-V diagram



(a). The molar heat capacity of the gas at constant pressure is 3R.

(b). The work done by the ideal gas in the process AB is $\frac{U_1 - U_0}{2}\ln 2$

(c). Assuming that the gas consists of a mixture of two gases, the gas is a mixture of di and tri atomic gases

The correction option is

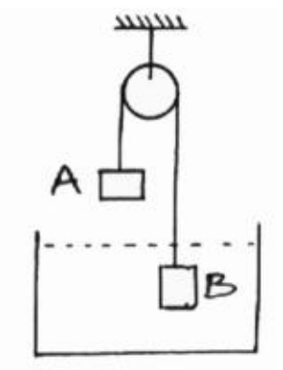
A. Only a, b are correct B. Only b, c are correct

C. Only c is correct D. All are correct [A]

Rough Work

E

21. In the arrangement shown, $m_B = 3m$,density of liquid is ρ and density of block B is 2ρ. The system is released from rest so that block *B* moves up when in liquid and moves down when completely out of liquid with the same acceleration. The mass of block *A* is [B]

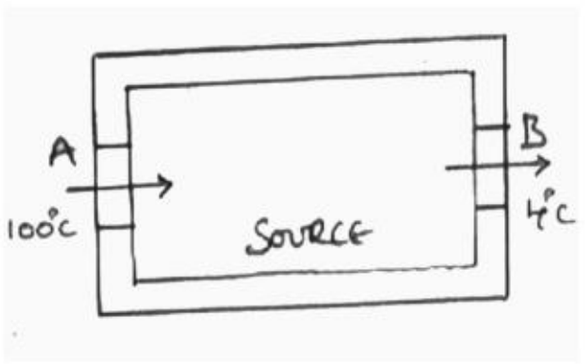


A. $\frac{9m}{2}$ B. $\frac{9m}{4}$ C. $2m$ D. $\frac{7m}{4}$

22. A refrigerator placed in a room at 300 k has inside temperature 200 *k*. How many calories of heat shall be delivered to the room for each 2 *kcal* of energy consumed by the refrigerator ideally?

A. 4 kcal B. 2 kcal C. 6 kcal D. 8 kcal [C]

23. A closed cubical box made of perfectly insulating material has walls of thicken 8cm and the only way for the heat to enter or leave the box is through the solid, cylindrical, metal plugs each of cross sectional area 12 cm^2 and length 8 *cm* fixed in the opposite walls of the box as shown in fig. The outer surface A is kept at $100^0 c$ while the outer surface B of other plug is kept at $4^0 c$ .The coefficient of thermal conductivity of material of the plugs is $0.5 cal/cm - \sec^0 c$. A source of energy generating 36 cal/sec is enclosed inside the box. The equilibrium temperature of the inner surface of the box assuming that it is same at all points on the inner surface is

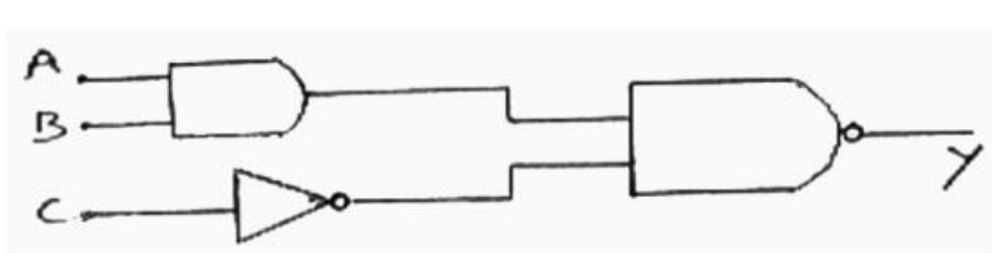


A. $52^0 c$ B. $76^0 c$ C. $48^0 c$ D. $62^0 c$ [B]

24. Suppose potential energy between electron and proton at separation r is given by $U = K \log r$, where K is a constant. For such a hypothetical hydrogen atom, the radius of n^{th} Bohr's orbit is

A. $\frac{nh}{2\pi\sqrt{mk}}$ B. $\frac{2\pi h}{n\sqrt{mk}}$ C. $\frac{nh}{2\pi mk}$ D. $\frac{n^2h^2}{2\pi mk}$ [A]

25. What is the output Y in the following circuit, when all the three inputs A, B, C are first 1 and then 0?



A. 0, 1 B. 0, 0 C. 1, 0 D. 1, 1 [D]

Rough Work

E

26. A sample of radioactive material decays simultaneously by two processes A and B with half- lives $\frac{1}{2}$ hr and $\frac{1}{4}$ hr respectively. For first half hour it decay with the process A, next one hour with the process B and for further half an hour with both A and B. If originally there were N_0 nuclei, the number of nuclei after 2 hours of such decay is [D]

A. $\frac{N_0}{2^4}$ B. $\frac{N_0}{2^2}$ C. $\frac{N_0}{2^6}$ D. $\frac{N_0}{2^8}$

27. A source of light is placed above a sphere of radius 10 *cm*. Find the maximum number of electrons emitted by the sphere before emission of photo electrons stop. The energy of incident photon is 4.2*ev* and the work function of metal is 1.5*ev* [C]

A. 2.08×10^{18} B. 4×10^{19} C. 1.875×10^{8} D. 2.88×10^{8}

28. A sinusoidal voltage $V(t)=100sin500t$ is applied across a pure inductance of $L=0.02H$. The current through the coil is [A]

A. -10cos500t B. -10sin500t

C. 10sin500t D. 10cos500t

29. The torque required to hold a small circular coil of 10 *turns*, area $1mm^2$ and carrying a current of $\left(\frac{21}{44}\right)A$ in the middle of a long solenoid of 10^3 *turns/m* carrying a current of 2.5 A, with its axis perpendicular to the axis of solenoid is [B]

A. Zero B. $1.5\times10^{-8}N-m$

C. $1.5\times10^{-3}N-m$ D. $1.5\times10^{-6}Nm$

30. Two identical drops of water are falling through air with a steady speed of *V* each. If the drops coalese to from a single drop, the new terminal velocity is [C]

A. $V^1=2^{3/2}V$ B. $V^1=2V$ C. $V^1=2^{2/3}V$ D. $V^1=2^2V$

Rough Work

E

SECTION - III
CHEMISTRY

31. In SN^2 reactions the correct order of reactivity for the following compounds

$CH_3Cl, CH_3CH_2Cl, (CH_3)_2CHCl$ and $(CH_3)_3Ccl$ is [A]

A. $CH_3Cl > CH_3CH_2Cl > (CH_3)_2CHcl > (CH_3)_3Ccl$

B. $CH_3CH_2Cl > CH_3Cl > (CH_3)_2CHcl > (CH_3)_3Ccl$

C. $(CH_3)_2CHcl > CH_3CH_2Cl > CH_3Cl > (CH_3)_3Ccl$

D. $CH_3Cl > (CH_3)_2CHcl > CH_3CH_2Cl > (CH_3)_3Ccl$

32. For the non Stoichiometric reaction $2A + B \rightarrow C + D$ the following kinetic data were obtained in the separate experiments all at *298K* [C]

Initial Concentration	*Initial Concentration*	*Initial rate of formation of C*
[A]	[B]	$mol.lit^{-1}\,\sec^{-1}$
0.1	0.1	1.2×10^{-3}
0.1	0.2	1.2×10^{-3}
0.2	0.1	2.4×10^{-3}

The rate law for formation of *C* is

A. $\frac{dc}{dt} = K[A]^2[B]$

B. $\frac{dc}{dt} = K[A][B]^2$

C. $\frac{dc}{dt} = K[A]$

D. $\frac{dc}{dt} = K[A][B]$

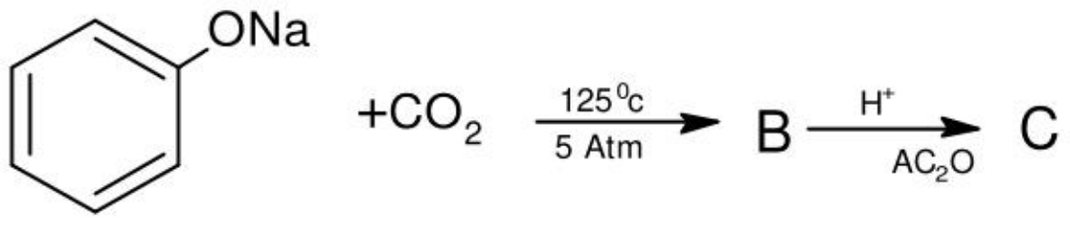
33. The structure of IF_7 is

A. Octahedral
B. Pentagonal bipyramidal
C. Square pyramidal
D. Trigonal bipyramidal [B]

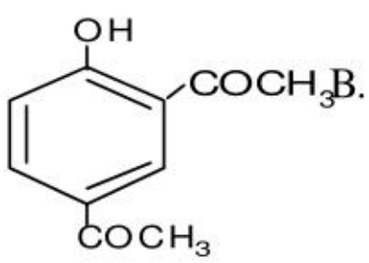
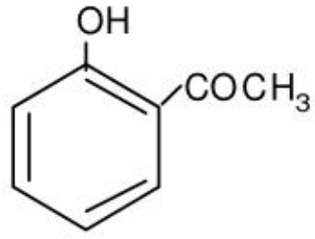
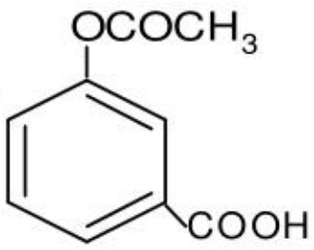
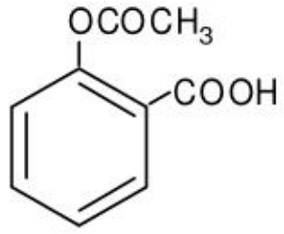
Rough Work

E

34. Sodium Phenoxide when heated with Co_2 under pressure $125^0 c$ yields a product, which on acetylation produces C.? [D]



The major product C would be:

A.  B.  C.  D. 

35. The correct set of four quantum numbers for the valency electrons of Rubidium atom *(Z=37)* is

A. 5,1,0,+1/2 B. 5,1,1,+1/2 [D]

C. 5,0,1,+1/2 D. 5,0,0,+1/2

36. Resistance of *0.2M* solution of an electrolyte is *50 ohms*. The specific conductance of the solution is $1.4 sm^{-1}$. The resistance of *0.5 M* solution of the same electrolyte is 280 ohm. The molar conductivity of *0.5 M* solution of the electrolyte in $sm^2 mol^{-1}$ is [D]

A. 5×10^{-3} B. 5×10^{3} C. 5×10^{2} D. 5×10^{-4}

37. The major organic compound formed by the reaction of 1, 1, 1-trichloro ethane with silver powder is

A. Ethene B. 2- Butyne

C. 2 - Butene D. Acetylene [B]

38. The most suitable reagent for the conversion of $RCH_2OH \rightarrow RCHO$ is

A. $K_2Cr_2O_7$ B. CrO_3 C. PCC D. $KMnO_4$ [C]

Rough Work

39. Allyl phenyl ether can be prepared by heating [D]

A. $C_6H_5CH = CH - Br + CH_3ONa$

B. $CH_2 = CHBr + C_6H_5CH_2ONa$

C. $C_6H_5Br + CH_2 = CH - CH_2ONa$

D. $CH_2 = CH - CH_2Br + C_6H_5ONa$

40. Vander Waals equation for a gas is stated as $P = \frac{nRT}{V - nb} - \left(\frac{an^2}{V^2}\right)$. This equation reduces to perfect gas equation $P = \frac{nRT}{V}$ when [C]

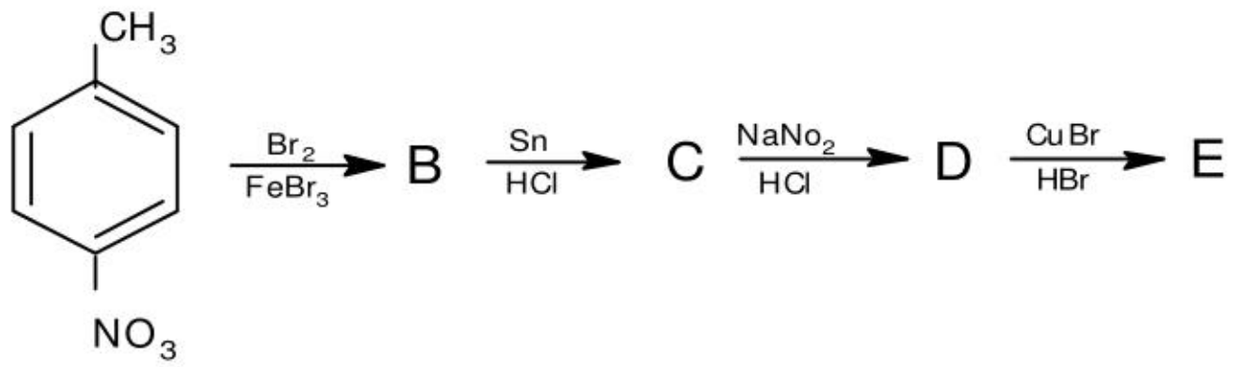
A. Both temperature and pressure are very low

B. Both temperature and pressure are very high

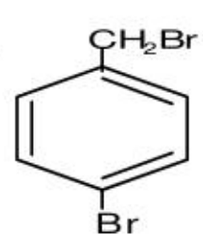
C. Temperature is sufficiently high and pressure is low

D. Temperature is sufficiently low and pressure is high

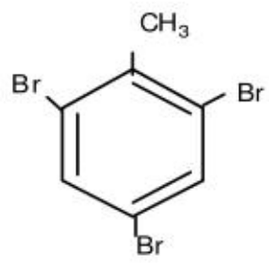
41. In a set of reactions P-nitro toluene yielded a product 'E' [C]



A. 

B. 

C. 

D. 

Rough Work

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42. For the estimation of nitrogen 1.4*g* of an organic compound was digested by Kjeldahl Method and evolved ammonia was absorbed in 60*ml* of $\frac{M}{10}H_2SO_4$. The unreacted acid requires 20ml of $\frac{M}{10}NaOH$ for complete neutralization. The percentage of nitrogen in the compound is [A]

A. 10% B. 3% C. 5 % D. 6%

43. *CsCl* crystallizes in body centered cubic lattice. If '*a*' is its edge length then which of the following expression is correct [B]

A. $rcs^+ + rcl^- = \frac{3a}{2}$ B. $rcs^+ + rcl^- = \frac{\sqrt{3}a}{2}$

C. $rcs^+ + rcl^- = \sqrt{3}a$ D. $rcs^+ + rcl^- = 3a$

44. For complete combustion of ethane $C_2H_5OH_{(l)} + 3O_{2(g)} \rightarrow 2CO_{2(g)} + 3H_2O_{(l)}$ the amount of heat produced as measured in bomb calorimeter is 1364.47*kj/mol* at $25^0 c$. Assuming the ideality the Enthalpy of combustion $\Delta_c H$ for the reaction will be

A. -1361.95 kJ /mol B. -1460.50 kJ/mol C. -1350.50 kJ/mol D. -1366.95 kJ/mol [D]

45. Which one is classified as a Condensation Polymer?

A. Neoprene B. Teflon C. Acrylonitrile D. Dacron [D]

Rough Work

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SECTION - IV
ENGLISH / APTITUDE

46. A boatman goes 2 km against the current of the stream in 1 hour and goes 1 *km* along the current in 10 minutes. How long will it take to go 5 *km* in stationary water? [C]

A. 40 minutes B. 1 hour C. 1 hr 15 min D. 1 hr 30 min

47. Two pipes *A* and *B* together can fill a cistern in 4 hours. Had they been opened separately, then *B* would have taken 6 hours more than A to fill the cistern. How much time will be taken by A to fill the cistern separately? [C]

A. 1 hour B. 2 hours C. 6 hours D. 8 hours

48. The sum of three numbers is 98. If the ratio of the first to second is 2 :3 and that of the second to the third is 5 : 8, then the second number is [B]

A. 20 B. 30 C. 48 D. 58

49. Seats for Mathematics, Physics and Biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of new seats?

A. 2 : 3 : 4 B. 6 : 7 : 8 C. 6 : 8 : 9 D. None of these [A]

50. If $log\ 27 = 1.431$, then the value of log 9 is [C]

A. 0.934 B. 0.945 C. 0.954 D. 0.958

51. If $A = x\%$ of y and $B = y\%$ of x, then which of the following is true? [C]

A. *A* is smaller than *B*. B. *A* is greater than *B*

C. *A* is equal to *B*. D. If *x* is smaller than *y*, then *A* is greater than *B*.

52. In a 300 *m* race *A* beats *B* by 22.5 *m* or 6 *seconds*. *B*'s time over the course is [B]

A. 86 sec B. 80 sec C.76 sec D. None of these

53. *A* runs 1 time as fast as *B*. If A gives B a start of 80 *m*, how far must the winning post be so that *A* and *B* might reach it at the same time? [A]

A. 200 m B. 300 m C. 270 m D. 160 m

Rough Work

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54. He was struck ____ lightning.

A. with B. by C. for D. at [B]

55. He has been living here _____a month.

A. from B. since C. for D. of [C]

56. Bharat goes to the office _____ foot.

A. on B. by C. in D. with [A]

57. Neena ____ the report by Monday. [A]

A. will submit B. will have submitted C. is submitting D. will be submitting

58. Sunitha said that she _____ on this novel for five years.

A. has been working B. had been working

C. have been working D. will work [B]

59. They _____ the old wall when it collapsed.

A. are painting B. was painting C. were painting D. paint [C]

Fill in the blanks with the suitable collective names front he options give below

60. Children were excited to see a _____ of candies. [A]

A. mint B. plague C. wisp D. prattle

Rough Work