

# NIMCET 2021 QUESTION PAPER

## MATHEMATICS

1. If  $|k| = 5$  and  $0^\circ \leq \theta \leq 360^\circ$ , then the number of distinct solutions of  $3 \cos \theta + 4 \sin \theta = k$  is  
(a) 0 (b) 1  
(c) 2 (d) infinite
2. The area of the region bounded by the  $X$ -axis and the curves defined by  $y = \tan x$ ,  $-\frac{\pi}{3} \leq x \leq \frac{\pi}{3}$  and  $y = \cot x$ ,  $\frac{\pi}{6} \leq x \leq \frac{3\pi}{2}$  is  
(a)  $-\frac{1}{2} \log 2$  (b)  $\frac{1}{2} \log 2$   
(c)  $\log 2$  (d) None of these
3. If  $\log(1 - x + x^2) = a_1x + a_2x^2 + a_3x^3 + \dots$ . Then  $a_3 + a_6 + a_9 + \dots$  is equal to  
(a)  $\log 2$  (b)  $\frac{2}{3} \log 2$   
(c)  $\frac{1}{3} \log 2$  (d)  $2 \log 2$
4.  $\lim_{x \rightarrow \infty} \left(\frac{x+7}{x+2}\right)^{x+5}$  equals to  
(a)  $e^5$  (b)  $e^{-5}$   
(c)  $e^2$  (d)  $e^{-2}$
5. The number of common tangents to the circle  $x^2 + y^2 = 4$  and  $x^2 + y^2 - 6x - 8y = 24$  is  
(a) 0 (b) 1  
(c) 3 (d) 4
6. In a  $\Delta ABC$ , if  $\tan^2 \frac{A}{2} + \tan^2 \frac{B}{2} + \tan^2 \frac{C}{2} = k$ , then  $k$  is always  
(a)  $> 1$  (b)  $\geq 1$   
(c)  $= 2$  (d)  $= 1$
7. Let  $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ ,  $\vec{b} = \hat{i} - \hat{j} + 2\hat{k}$  and  $\vec{c} = \hat{i} + \hat{j} - 2\hat{k}$  are three vectors. Then, a vector in the plane of  $\vec{a}$  and  $\vec{c}$  whose projection on  $\vec{b}$  is of magnitude  $\frac{1}{\sqrt{6}}$  is  
(a)  $3\hat{i} - 2\hat{j}$  (b)  $3\hat{i} + 2\hat{j}$   
(c)  $2\hat{i} + 3\hat{j} - \hat{k}$  (d)  $3\hat{i} + 2\hat{j} + \hat{k}$
8. For what value of  $p$ , the polynomial  $x^4 - 3x^3 + 2px^2 - 6$  is exactly divisible by  $(x - 1)$   
(a) 2 (b) 4  
(c) 6 (d) 8

9. If  $F(\theta) = \begin{bmatrix} \cos \theta & -\sin \theta & 0 \\ \sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ , then  $F(\theta)F(\alpha)$  is equal to
- (a)  $F(\theta\alpha)$  (b)  $F\left(\frac{\theta}{\alpha}\right)$   
 (c)  $F(\theta + \alpha)$  (d)  $F(\theta - \alpha)$
10. If  $\frac{n!}{2!(n-2)!}$  and  $\frac{n!}{4!(n-4)!}$  are in the ratio 2:1, then the value of  $n$  is
- (a) 0 (b) 2  
 (c) 4 (d) 5
11. The locus of the point of intersection of tangents to the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  which meet right angles is
- (a) a circle (b) a parabola  
 (c) an ellipse (d) a hyperbola
12. If the position vector of A and B relative to O be  $\hat{i} - 4\hat{j} + 3\hat{k}$  and  $-\hat{i} + 2\hat{j} - \hat{k}$  respectively, then the median through O of  $\triangle ABC$  is:
- (a)  $-2\hat{i} + 2\hat{k}$  (b)  $-\hat{j} + \hat{k}$   
 (c)  $-\hat{i} - \hat{j} + \hat{k}$  (d)  $-\hat{i} - \hat{j} - \hat{k}$
13. The general value of  $\theta$ , satisfying the equation,  $\sin \theta = -\frac{1}{2}$ ,  $\tan \theta = \frac{1}{\sqrt{3}}$  is:
- (a)  $n\pi + \frac{\pi}{6}, n \in I$   
 (b)  $n\pi + (-1)^n \left(\frac{7\pi}{6}\right), n \in I$   
 (c)  $2n\pi \pm \frac{7\pi}{6}, n \in I$   
 (d)  $2n\pi + \frac{11\pi}{6}, n \in I$
14. The area of the triangle formed by the vertices whose position vectors are  $3\hat{i} + \hat{j}$ ,  $5\hat{i} + 2\hat{j} + \hat{k}$ ,  $\hat{i} - 2\hat{j} + 3\hat{k}$  is
- (a)  $\sqrt{21}$  sq. units (b)  $\sqrt{23}$  sq. units  
 (c)  $\sqrt{33}$  sq. units (d)  $\sqrt{29}$  sq. units
15. The standard deviation of 20 numbers is 30. If each of the numbers is increased by 4, then the new standard deviation will be
- (a) 24 (b) 34  
 (c) 30 (d) 20
16. The function  $f(x) = \frac{x}{1+x \tan x}$ ,  $0 \leq x \leq \frac{\pi}{2}$  is maximum when
- (a)  $x = \sec x$  (b)  $x = \tan x$   
 (c)  $x = \cos x$  (d) None of the above

17. If  $f: R \rightarrow R$  is defined by

$$f(x) = \begin{cases} \frac{x+2}{x^2+3x+2} & \text{if } x \in R - \{-1, -2\} \\ -1 & \text{if } x = -2 \\ 0 & \text{if } x = -1 \end{cases}, \text{ then } f(x) \text{ is continuous on the set}$$

- (a)  $R$  (b)  $R - \{-2\}$   
(c)  $R - \{-1\}$  (d)  $R - \{-1, -2\}$

18. A polygon has 44 diagonals, the number of sides are

- (a) 9 (b) 10  
(c) 11 (d) 12

19. The probability of occurrence of two events E and F are 0.25 and 0.50, respectively. the probability of their simultaneous occurrence is 0.14. the probability that neither E nor F occur is

- (a) 0.61 (b) 0.11  
(c) 0.39 (d) 0.89

20. If  $y = \tan^{-1} \left( \frac{3x-x^3}{1-3x^3} \right)$ ,  $-\frac{1}{\sqrt{3}} < x < \frac{1}{\sqrt{3}}$ , then  $\frac{dy}{dx}$  is

- (a)  $-\frac{1}{1+x^2}$  (b)  $\frac{3}{1+x^2}$   
(c)  $\frac{3}{\sqrt{1+x^2}}$  (d)  $\frac{1}{\sqrt{1+x^2}}$

21. The value of

$\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$  is equal to

- (a) 5 (b) 3  
(c) 4 (d) 6

22. In a triangle, if the sum of two sides is  $x$  and their product is  $y$  such that  $(x+z)(x-z) = y$ , where  $z$  is the third side of the triangle, then triangle is

- (a) equilateral (b) Right angled  
(c) Isosceles (d) Obtuse angled

23. If  $H_1, H_2, \dots, H_n$  are  $n$  harmonic means between  $a$  and  $b$  ( $\neq a$ ), then  $\frac{H_1+a}{H_1-a} + \frac{H_n+b}{H_n-b} =$

- (a)  $2n$  (b)  $n+1$   
(c)  $n-1$  (d)  $2n+1$

24. If  $y = \sin^{-1} \left( \frac{x^2+1}{\sqrt{1+3x^2+x^4}} \right)$  ( $x > 0$ ), then  $\frac{dy}{dx} =$

- (a)  $\frac{x^2-1}{x^4+3x^2+1}$   
(b)  $\frac{x^2+1}{x^4+3x^2+1}$   
(c)  $\frac{x^2-1}{x^4-3x^2+1}$   
(d)  $\frac{x^2+1}{x^4-3x^2+1}$

25. If  $32 \tan^8 \theta = 2 \cos^2 \alpha - 3 \cos \alpha$  and  $3 \cos 2\theta = 1$ , then the general value of  $\alpha$  for
- (a)  $n\pi \pm \frac{\pi}{3}$  (b)  $2n\pi \pm \frac{2\pi}{3}$   
 (c)  $2n\pi \pm \frac{\pi}{3}$  (d)  $n\pi \pm \frac{2\pi}{3}$
26. In a triangle ABC  $a \cos^2 \frac{C}{2} + c \cos^2 \frac{A}{2} = \frac{3b}{2}$ , then the sides of the triangle are in
- (a) AP (b) GP  
 (c) HP (d) None of the above
27. If  $\theta$  is acute angle between the pair of lines  $x^2 - 7xy + 12y^2 = 0$ , then  $\frac{2 \cos \theta + 3 \sin \theta}{4 \sin \theta + 5 \cos \theta} =$
- (a)  $\frac{29}{69}$  (b)  $\frac{61}{39}$   
 (c)  $\frac{39}{61}$  (d)  $\frac{69}{29}$
28. The four geometric means between 2 and 64 are
- (a)  $\frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}$  (b) 4, 8, 16, 32  
 (c)  $4\sqrt{2}, 8, 16\sqrt{2}, 32$  (d) None of the above
29. The lines  $px + qy = 1$  and  $qx + py = 1$  are respectively the sides AB, AC of the triangle ABC and the base BC is bisected at  $(p, q)$ . Equation of the median of the triangle through the vertex A is
- (a)  $(2pq - 1)(qx + py - 1) - (p^2 + q^2 - 1)(px + qy - 1) = 0$   
 (b)  $(2pq - 1)(px + qy - 1) + (p^2 + q^2 - 1)(qx + py - 1) = 0$   
 (c)  $(2pq - 1)(px + qy - 1) - (p^2 + q^2 - 1)(qx + py - 1) = 0$   
 (d)  $(2pq - 1)(qx + py - 1) + (p^2 + q^2 - 1)(px + qy - 1) = 0$
30. If the vectors  $a\hat{i} + \hat{j} + \hat{k}, \hat{i} + b\hat{j} + \hat{k}, \hat{i} + \hat{j} + c\hat{k}$  ( $a, b, c \neq 1$ ) are coplanar, then  $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$
- (a) 0 (b) 1  
 (c) 2 (d) 3
31. Let  $\vec{a} = \hat{i} + \hat{j}$  and  $\vec{b} = 2\hat{i} - \hat{k}$ . Then, the point of intersection of the lines  $\vec{r} \times \vec{a} = \vec{b} \times \vec{a}$  and  $\vec{r} \times \vec{b} = \vec{a} \times \vec{b}$  is
- (a)  $-\hat{i} + \hat{j} + \hat{k}$  (b)  $3\hat{i} - \hat{j} + \hat{k}$   
 (c)  $\hat{i} - \hat{j} - \hat{k}$  (d)  $3\hat{i} + \hat{j} - \hat{k}$
32. If the system of equations  $3x - y + 4z = 3$ ,  $x + 2y - 3z = -2$ ,  $6x + 5y + \lambda z = -3$  has atleast one solution, then  $\lambda =$
- (a) -5 (b) 3  
 (c) 5 (d) 6
33. If a variable takes values 0, 1, 2, ..., 50 with frequencies 1,  ${}^{50}C_1, {}^{50}C_2, \dots, {}^{50}C_{50}$ , then the AM is
- (a) 50 (b) 25

(c)  $\frac{2^{50}}{50}$

(d) 51

34. If  $A = \{1, 2, 3, 4\}$  and  $B = \{3, 4, 5\}$ , then the number of elements in

$(A \cup B) \times (A \cap B) \times (A \Delta B)$

(a) 18

(b) 20

(c) 24

(d) 30

35. If  $n$  is an integer between 0 to 21, then find a value of  $n$  for which the value of  $n!(21 - n)!$  is minimum

(a) 9

(b) 10

(c) 12

(d) 21

36. Suppose  $A_1, A_2, \dots, A_{30}$  are 30 sets each with five elements and  $B_1, B_2, B_3, \dots, B_n$  are  $n$  sets (each with three elements) such that  $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^n B_j = S$  and each element of  $S$  belongs to exactly ten of the  $A_i$ 's and exactly 9 of the  $B_j$ 's. Then  $n =$

(a) 15

(b) 45

(c) 75

(d) 90

37. The eccentric angle of the extremities of latus-rectum of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  are given by

(a)  $\tan^{-1}\left(\pm \frac{ae}{b}\right)$

(b)  $\tan^{-1}\left(\pm \frac{be}{e}\right)$

(c)  $\tan^{-1}\left(\pm \frac{b}{ae}\right)$

(d)  $\tan^{-1}\left(\pm \frac{a}{be}\right)$

38. If  $\alpha \neq \beta$  and  $\alpha^2 = 5\alpha - 3$ ,  $\beta^2 = 5\beta - 3$ , then the equation whose roots are  $\frac{\alpha}{\beta}$  and  $\frac{\beta}{\alpha}$  is

(a)  $3x^2 - 25x + 3 = 0$

(b)  $3x^2 + 5x + 3 = 0$

(c)  $3x^2 - 5x + 3 = 0$

(d)  $3x^2 - 19x + 3 = 0$

39. The probability that a man who is  $x$  years old will die in a year is  $p$ . Then, amongst  $n$  persons  $A_1, A_2, \dots, A_n$  each  $x$  year old now, the probability that  $A_1$  will die in one year is

(a)  $\frac{1}{n^2}$

(b)  $1 - (1 - p)^n$

(c)  $\frac{1}{n^2} [1 - (1 - p)^n]$

(d)  $\frac{1}{n} [1 - (1 - p)^n]$

40. Angle between  $\vec{a}$  and  $\vec{b}$  is  $120^\circ$ . If  $|\vec{b}| = 2|\vec{a}|$  and the vectors  $\vec{a} + x\vec{b}$ ,  $\vec{a} - \vec{b}$  are at right angle, then  $x =$

(a)  $\frac{1}{3}$

(b)  $\frac{1}{5}$

(c)  $\frac{2}{3}$

(d)  $\frac{2}{5}$

41. If a number  $x$  is selected at random from natural numbers  $1, 2, \dots, 100$ , then the probability for  $x + \frac{100}{x} > 29$  is
- (a)  $\frac{37}{50}$  (b)  $\frac{39}{50}$   
 (c)  $\frac{41}{50}$  (d)  $\frac{43}{50}$
42. If  $X$  and  $Y$  are two sets, then  $X \cap Y' \cap (X \cup Y)'$  is
- (a)  $X'$  (b)  $Y'$   
 (c)  $\phi$  (d) None of the above
43.  $\int e^x (\sin hx + \cos hx) dx = ?$
- (a)  $e^x \operatorname{sech} x + C$   
 (b)  $e^x \cos hx + C$   
 (c)  $\sinh 2x + C$   
 (d)  $\cosh 2x + C$
44. If  $\vec{e}_1 = (1, 1, 1)$  and  $\vec{e}_2 = (1, 1, -1)$  and  $\vec{a}$  and  $\vec{b}$  are two vectors such that  $\vec{e}_1 = 2\vec{a} + \vec{b}$  and  $\vec{e}_2 = \vec{a} + 2\vec{b}$ , then angle between  $\vec{a}$  and  $\vec{b}$  is
- (a)  $\cos^{-1}\left(-\frac{7}{11}\right)$  (b)  $\cos^{-1}\left(\frac{7}{11}\right)$   
 (c)  $\cos^{-1}\left(\frac{7}{9}\right)$  (d)  $\cos^{-1}\left(\frac{6\sqrt{2}}{11}\right)$
45. If  $P(1, 2), Q(4, 6), R(5, 7)$  and  $S(a, b)$  are the vertices of a parallelogram PQRS, then
- (a)  $a = 2, b = 3$  (b)  $a = 3, b = 4$   
 (c)  $a = 2, b = 4$  (d)  $a = 3, b = 5$
46. If  $a \cos \theta + b \sin \theta = 2$  and  $a \sin \theta - b \cos \theta = 3$ , then  $a^2 + b^2 =$
- (a) 6 (b) 5  
 (c) 13 (d) 10
47. If three thrown of three dice, the probability of throwing triplets not more than twice is
- (a)  $1 - \frac{1}{6^2}$  (b)  $1 - \frac{1}{6^3}$   
 (c)  $1 - \frac{1}{36^2}$  (d)  $1 - \frac{1}{36^3}$
48.  $\int 3^{3^{3^x}} \cdot 3^{3^x} \cdot 3^x dx$  is equal to
- (a)  $\frac{3^{3^x} \cdot 3^x}{(\log 3)^3} + c$  (b)  $\frac{3^x}{(\log 3)^3} + c$   
 (c)  $\frac{3^{3^x}}{(\log 3)^3} + c$  (d)  $\frac{3^{3^{3^x}}}{(\log 3)^3} + c$
49. There are 50 questions in a paper. Find the number of ways in which a student can attempt one or more questions :
- (a)  $2^{50} - 1$  (b)  $2^{50} + 1$   
 (c)  $2^{50} - 2$  (d)  $2^{50} + 2$

50. Consider the following frequency distribution table.

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	180	$f_1$	34	180	136	$f_2$	50

If the total frequency is 686 and the median is 42.6, then the value of  $f_1$  and  $f_2$  are

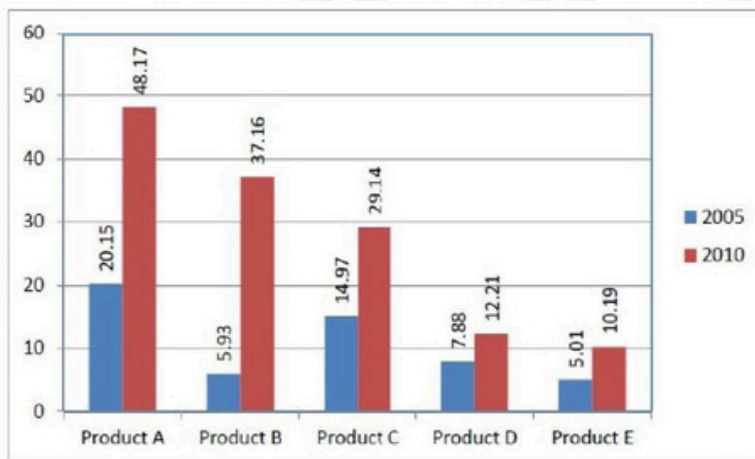
- (a) 81,25                      (b) 82,24  
(c) 83,23                      (d) 84,22

## ANALYTICAL ABILITY & LOGICAL REASONING

51. Choose the word which has the same relationship among the given three words:  
Yellow, Blue, Red

- (a) Black                      (b) Orange  
(c) White                      (d) Paint

52. A company produces five different products. The sales of these five products (in lakh number of packs) during 2005 and 2010 are shown in the following bar – graph. Question is based on this graph.  
Sales (in lakh number of packs) of five different products of a company during 2005-2010.



The sales of Products a in 2010 was by that percent more than the sales of Product B in 2010? (rounded off to the nearest integer)

- (a) 33%                      (b) 31%  
(c) 28%                      (d) 22%

53. Choose the pair of number that comes next:

1 10 7 20 13 30 19

- (a) 25 22                      (b) 26 24  
(c) 26 23                      (d) 25 23

54. Read the information given below and answer the following question:



- i. In a family of six persons A,B,C,D,E and F, there are two married couples.
- ii. D Is grandmother of A and mother of B.
- iii. C is wife of B and mother of F.
- iv. F is the granddaughter of E.

Who among the following is one of the couples?

- (a) CD (b) DE
- (c) EB (d) None of these

55. If  $Z = 52$  and  $ACT = 48$ , then  $BAT$  will be equal to

- (a) 46 (b) 39
- (c) 44 (d) 41

56. Read the information given below and answer the following question:

- i. In a family of six persons A,B,C,D,E and F there are two married couples.
- ii. D Is grandmother of A and mother of B.
- iii. C is wife of B and mother of F.
- iv. F is the granddaughter of E.

Which of the following is true?

- (a) A is brother of F. (b) A is sister of F.
- (c) D has two grandsons. (d) None of these

57. Read the information given below and answer the following question:

- i. In a family of six persons A,B,C,D,E and F , there are two married couples.
- ii. D is grandmother of A and mother of B.
- iii. C is wife of B and mother of F.
- iv. F is the granddaughter of E.

What is C to A?

- (a) Daughter (b) Grandmother
- (c) Mother (d) Cannot be determined

58. Find the matching term for Music : Guitar : Performer.

- (a) Dance : Tune : Instrument
- (b) Food : Recipe : Cook
- (c) Patient : Medicine : doctor
- (d) Trick : Rope : Acrobat

59. If  $9 \times 3 + 8 = 24$ ,  $10 \times 2 + 7 = 35$  and  $80 \times 40 + 3 = 6$ , then find the value of  $12 \times 4 + 3 = ?$

- (a) 7 (b) 9
- (c) 12 (d) 16

60. Choose the missing term out of the given alternatives:

Q1F , S2E , U6D , W21C , ?

- (a) Y66B (b) Y44B
- (c) Y88B (d) Z886



61. Study the following table carefully and answer the following question.

Subjects (Full Marks 50)	40 and above	30 and above	20 and above	10 and above	0 and baove
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Aggregate	7	27	73	87	100

If it is known that at least 23 students were eligible for a Symposium on Chemistry, the minimum qualifying marks in Chemistry for eligibility to Symposium would lie in the range:

- (a) 30 – 40 (b) 20 – 30  
(c) Below 20 (d) Cannot be determined

62. In a certain code language, "do re me" means "he is late"; "fa me la" means "she is early" and "so ti do" means "he leaves soon". Which word in the language means 'late'?

- (a) la (b) do  
(c) me (d) re

63. Find the missing term 7 : 56 :: 9 : ?

- (a) 63 (b) 81  
(c) 90 (d) 99

64. In this series, looking at the letter pattern fill the blank in the middle of the series:  
ELFA, GLHA, IUA, \_\_\_\_\_, MLNA

- (a) OLPA (b) KLMA  
(c) LLMA (d) KLLA

65. Read the following Information carefully and then answer the following question:

- i P  $\psi$  Q means P is mother of Q  
ii. P  $\in$  CI means P is sister of Q  
iii. P \$ Q means P is father of Q  
iv. P # Q means P is brother of Q  
Which of the following means R is brother of T?

- (a) R  $\psi$  S#U\$T (b) U  $\psi$  R#S#T  
(c) U  $\psi$  R  $\in$  S  $\psi$  T (d) T#\$Q  $\in$  R

66. Choose the pair that best represents a similar relationship to the one expressed in the original pair of words:  
WAITRESS : RESTAURANT

- (a) doctor : diagnosis (b) actor : role  
(c) driver : truck (d) teacher : school

67. COUNSEL is to BITIRAK, so also GUIDANCE is to \_\_\_\_\_ ?

- (a) EOHYZKBB (b) FOHYZJBB  
(c) FPHZZKAB (d) HOHYBJBA

68. Choose the number pair or group that is different from others?

- (a) 15:46 (b) 12:37  
(c) 9:28 (d) 8:33

69. If it is Saturday on January 1, 2000, then January 1, 2001 would have been

- (a) Monday (b) Sunday  
(c) Tuesday (d) Friday

70. Radha is twice as old as Rita was 2 years ago. If difference between their ages is 2 years, how old is Radha today?

- (a) 6 (b) 8  
(c) 10 (d) 12

71. How many times in a day are the hands of a clock pointing opposite to each other? ?

- (a) 4 (b) 20  
(c) 22 (d) 24

72. Study the following table carefully and answer the following question.

Subjects (Full Marks 50)	40 and above	30 and above	20 and above	10 and above	0 and baove
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Aggregate	7	27	73	87	100

If at least 60% marks in Physics are required for pursuing higher studies in Physics, how many students will be eligible to pursue higher studies in Physics?

- (a) 27 (b) 32  
(c) 34 (d) 41

73. Study the following table carefully and answer the following question.

Subjects (Full Marks 50)	40 and above	30 and above	20 and above	10 and above	0 and baove
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Aggregate	7	27	73	87	100

The number of students scoring less than 40% marks in aggregate is:

- (a) 13 (b) 19  
(c) 27 (d) 20

74. Choose the missing term: BYCX : DWEV : : FUGT : ?

- (a) EHIJ (b) GHIJ  
(c) HSIR (d) SRHS

75. Read the information given below and answer the following question:

- i. In a family of six persons A,B,C, D,E and F , there are two married couples.  
ii. D is grandmother of A and mother of B.

iii. C is wife of B and mother of F.

iv. F is the granddaughter of E.

**How many male members are there in the family?**

- (a) Three
- (b) Two
- (c) Cannot be determined
- (d) None of these

76. Read the following information carefully and then answer the following question:

i.  $P \psi Q$  means P is mother of Q

ii.  $P \in E Q$  means P is sister of Q

iii.  $P \$ Q$  means P is father of Q

iv.  $P \# Q$  means P is brother of Q

**If  $K \psi L \in M \# N$ , then how K is related with N?**

- (a) Mother
- (b) Aunt
- (c) Great Aunt
- (d) Grandmother

77. Choose the correct option for the remainder when  $X = 1! + 2! + 3! + \dots + 100!$  is divided by 24

- (a) 9
- (b) 11
- (c) 152
- (d) 13

78. There are six members in a family. A is the father of D, E is the grandfather of D. B is the daughter-in-law of C. F is the uncle of D. What is the relationship of C with F?

- (a) Sister
- (b) Mother-in-law
- (c) Nephew
- (d) Data inadequate

79. Read the following information carefully and then answer the following question:

i.  $P \psi Q$  means P is mother of Q

ii.  $P \in E Q$  means P is sister of Q

iii.  $P \$ Q$  means P is father of Q

iv.  $P \# Q$  means P is brother of Q

**Which of the following means N is definitely daughter of K?**

- (a)  $K \$ L \# M \# N$
- (b)  $M \psi K \$ N \in L$
- (c)  $K \psi M \# L \in N$
- (d)  $L \psi K \$ N \# M$

80. Choose the word that is a necessary part of the underlined word: harvest

- (a) autumn
- (b) crop
- (c) stockpile
- (d) tractor

81. Study the following table carefully and answer the following question.

Subjects (Full Marks 50)	40 and above	30 and above	20 and above	10 and above	0 and baove
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100

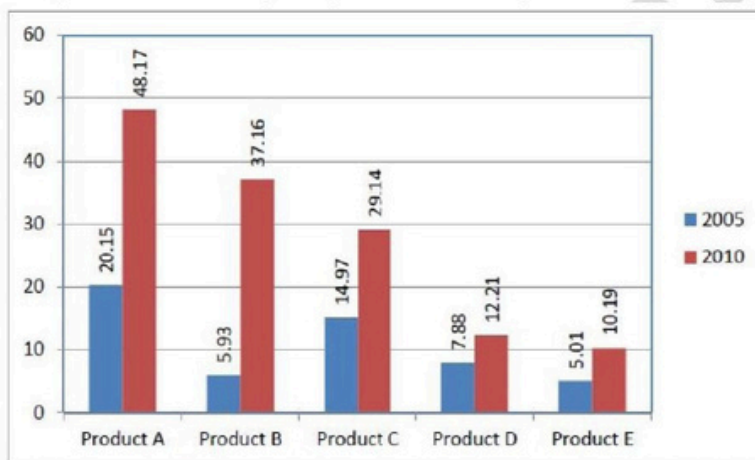
Aggregate	7	27	73	87	100
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What is the difference between the number of students passed with 30 as cut – off marks in chemistry and those passed with 30 as cut – off marks in aggregate?

- (a) 3 (b) 4  
(c) 5 (d) 6

82. A company produces five different products. The sales of these five products (in lakh number of packs) during 2005 and 2010 are shown in the following bar – graph. Question is based on this graph.

Sales (in lakh number of packs) of five different products of a company during 2005-2010.



During the period 2005-2010, the minimum rate of increase in sales is in the case of :

- (a) Product A (b) Product B  
(c) Product D (d) Product E

83. Insert the missing number 8, 7, 11, 12, 14, 17, 17, 22, ?

- (a) 27 (b) 20  
(c) 22 (d) 24

84. Choose the pair that best represents a similar relationship to the one expressed in the original pair of words: PULSATE : THROB

- (a) walk : run (b) tired : sleep  
(c) examine : scrutinize (d) ballet : dancer

85. In a class of 50 students, Raghu's rank is twice that of Paul. There are 10 students who have ranked worse than that of Raghu. Paul's rank in the class is:

- (a) 5th (b) 10th  
(c) 15th (d) 20th

86. Choose the odd one:

- (a) Zebra (b) Hyena  
(c) Rhinoceros (d) Giraffe

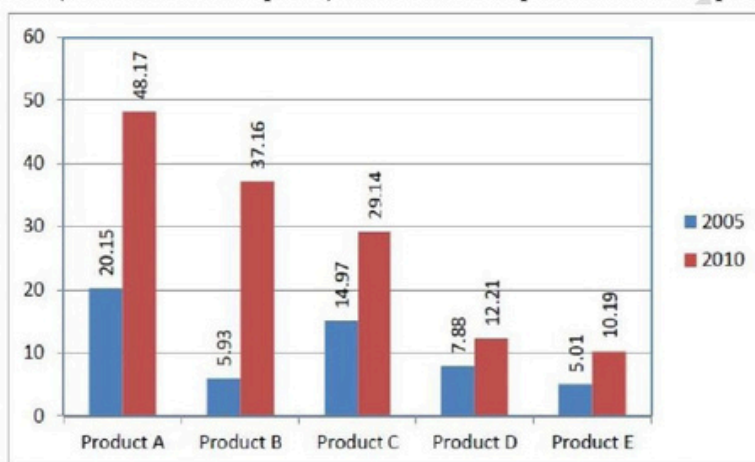


87. If 'A3T15R' stands for 'ACTOR' and 'D1T5' stands for DATE, how will you code 'ROTATE'?

- (a) R16T1T5                      (b) R15T1T5  
(c) R15T1T16                    (d) R15C1&7

88. A company produces five different products. The sales of these five products (in lakh number of packs) during 2005 and 2010 are shown in the following bar – graph. Question is based on this graph.

Sales (in lakh number of packs) of five different products of a company during 2005-2010.



The sales have increased by nearly 55% from 2005 to 2010 in case of :

- (a) Product A                      (b) Product B  
(c) Product C                      (d) Product D

89. Which word does NOT belong with the others?

- (a) wing                              (b) fin  
(c) beak                              (d) rudder

90. Insert the missing number: 16, 33, 65, 131, 261, ?

- (a) 523                              (b) 521  
(c) 613                              (d) 721

## COMPUTER AWARENESS

91. The process when processor fetch or decode another instruction during the execution of current instruction is called

- (a) Supercomputing              (b) Pipelining  
(c) Cloud computing              (d) Grid computing

92. Which of the following is used by ALU to store the intermediate results?

- (a) Stack                              (b) Heap  
(c) Registers                          (d) Accumulators

93. One TeraByte (TB) = \_\_\_\_\_ GB and One ExaByte (EB) = \_\_\_\_\_ GB  
(a)  $2^{10}$ GB,  $2^{16}$ GB      (b)  $2^{10}$ GB,  $2^{20}$ GB  
(c)  $2^{10}$ GB,  $2^{24}$ GB      (d)  $2^{10}$ GB,  $2^{30}$ GB
94. The Cache Memory is more effective because of  
(a) Memory localization  
(b) Locality of reference  
(c) Memory size  
(d) None of the mentioned
95. Which of the following is the fastest means of memory access for CPU?  
(a) Registers      (b) Cache  
(c) Main memory      (d) Stack
96. The number  $(2217)_8$  is equivalent to  
(a)  $(608)_{16}$       (b)  $(028F)_{16}$   
(c)  $(048F)_{16}$       (d)  $(2297)_{10}$
97. To fetch data from the secondary memory which one of the following register is used  
(a) MAR      (b) PC  
(c) IR      (d) MBR
98. The binary multiplication  $00*11$  will give  
(a) 11      (b) 00  
(c) 01      (d) 10
99. Consider a computer system with speed of  $10^6$  instructions per second. A program P, having  $2n^2$  steps is run on this system, where n is the input size. If  $n = 10000$ , what is the execution time for P ?  
(a) 1.2 seconds      (b) 20 seconds  
(c) 100 seconds      (d) 200 seconds
100. To access the I/O devices the status flags is continuously checked in  
(a) Program controlled I/O  
(b) Memory mapped I/O  
(c) I/O mapped  
(d) None of the above

## GENERAL ENGLISH

*Read the following passage carefully and answer the question that follow:*

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution



for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**101. Mere knowledge and culture may be distinguished from each other in that:**

- (a) The former widens the mental horizon, the latter enlarges the hearts.
- (b) The former gratifies curiosity, the latter refines personality.
- (c) The former is concerned with facts, the latter with fiction.
- (d) The former adds to power, the latter adds to prestige.

**102. Read the following passage carefully and answer the question that follow:**

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**What is the function of education according to the ancient Indian philosophers?**

- (a) Education is the development mind.
- (b) Education brings about salvation and development of the soul.
- (c) Education is the cultivation of culture.
- (d) Education aims at the inculcation of generosity.

103. Choose the most suitable synonym of the given word:

SCINTILLATING

- (a) touching
- (b) nagging
- (c) glittering
- (d) warning

104. Choose the most suitable synonym of the given word:

BLAND

- (a) pleasant
- (b) harsh
- (c) irritating
- (d) tasteless

105. Read the following passage carefully and answer the question that follow:

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture Is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul Is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**What is meant by "leaden weights".?**

- (a) Weights made of leaden.
- (b) Cold scientific knowledge.
- (c) Hindering factors, of pride and prejudice, passion, and desire, in the liberation of the soul.
- (d) Social and family responsibilities.

106. Read the following passage carefully and answer the question that follow:



It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture Is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul Is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**The function of university is :**

- (a) To enable the young to gather facts about the world.
- (b) To learn to do his job.
- (c) To prepare the young to take their place in society.
- (d) To enable them to learn to talk with others.

107. Read the following passage carefully and answer the question that follow:

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture Is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul Is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not

merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**According to the passage, the function of the teacher is :**

- (a) To remove leaden weights of pride and prejudice, passion, and desire to liberate the soul.
- (b) To instill facts into the minds of the students.
- (c) To teach humanity.
- (d) To foster brotherhood,

108. Fill in the blank with the most appropriate word given:

I cannot \_\_\_\_\_ it to you right now; tomorrow we will discuss about it.

- (a) demand
- (b) disturb
- (c) explain
- (d) expect

109. Read the following passage carefully and answer the question that follow:

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture Is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul Is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**What are the hindering factors in the liberation and development of the soul?**

- (a) Power and wealth
- (b) Passion and desire, pride and prejudice
- (c) Money and influence
- (d) Greed and envy

110. Choose the most suitable synonym of the given word?

RECUPERATE

- (a) recapture
- (b) reclaim



- (c) recover (d) recur

111. Fill in the blank with the most appropriate word:

The \_\_\_\_\_ with which he is able to wield the paint – brush is really remarkable?

- (a) ease (b) practice  
(c) sweep (d) gait

112. Read the following passage carefully and answer the question that follow:

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture Is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul Is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**What is the object of education according to Goethe?**

- (a) It teaches social manners.  
(b) It teaches courtesy.  
(c) It communicates knowledge.  
(d) It forms taste.

113. Choose the most suitable antonym of given word:

ERUDITE

- (a) scholarly (b) unfamiliar  
(c) illiterate (d) arrogant

114. Which one word for the following:

An uncivilized / primitive person.

- (a) barbarian (b) ascetic  
(c) bourgeois (d) altruist

115. Fill in the blank with the most appropriate word:

The car driver was arrested for rash driving and his license was \_\_\_\_\_ by the police.

- (a) impounded (b) flown
- (c) penalized (d) banned

116. Fill in the blank with the most appropriate word:

The State Transportation Corporation has \_\_\_\_\_ a loss of 5 crore INR this year.

- (a) derived (b) incurred
- (c) performed (d) formulated

117. Choose the most suitable antonym of given word:

NEGLIGENCE

- (a) diligence (b) meticulousness
- (c) integrity (d) honest

118. Write one word for the following:

One who does not save for future.

- (a) incorporeal (b) inedible
- (c) improvident (d) implacable

119. Fill in the blank with the most appropriate word given in the options.

The child prefers rooms with \_\_\_\_\_ ceilings.

- (a) tall (b) long
- (c) higher (d) high

120. Read the following passage carefully and answer the question that follow:

It is said with truth that the function of a university is to prepare the young to take their place in human society. It must provide Its members with the knowledge and skill necessary to make them efficient citizens. But is the whole duty of man exhausted by the acquisition of knowledge and professional training? Is a university only an institution for higher learning, a factory which churns out clerks and technicians able to run the machinery of the State? Mere knowledge which gratifies curiosity is different from culture which refines personality. Culture is not remembering a mass of serious details about the dates of birth of the great heroes of the world or the interesting names of the fastest ships which cross the Atlantic or entertaining odds and ends gathered from the latest who's who. A well-known institution of this country has for Its motto *sa vidya yavimuchyate*: that is, knowledge which is designed for salvation, for the development of the soul, is the best. Such an idea is not merely an Indian idiosyncrasy. Plato said long ago that the culture of soul is "the first and fairest thing that the best of men can ever have. According to Goethe, the object of education is to form tastes and not simply to communicate knowledge. A man's culture Is not judged by the amount of tabulated information which he has at his command, but by the quality of mind which he brings to bear on the facts of life. Education is not cramming the mind with a host of technical details, putting sight, as it were, into blind eyes. The eye of the soul Is never blind, only its gaze may be turned to the false and the fleeting. Too often the vision may be dragged downwards by the "leaden weights" of pride and prejudice, of passion and desire. The function of the teacher is not to add to the "leaden weights" but remove them and liberate the soul from the encumbrance so that it may follow its native impulse to soar upwards. The student at a university does not merely learn something, but becomes something by being exposed, in the most elastic period of his life, to



transforming influences, such as the constant clash of mind with mind, the interchange of ideas, the testing of opinions, and the growth of knowledge of human nature.

**What is the man's culture judged by?**

- (a) By the quality of mind which he brings to bear on the facts of life.
- (b) By man's social skill.
- (c) By the variety of books he reads.
- (d) By money and influence.

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## ANSWER KEY

1.C	2.C	3.B	4.A	5.B	6.B	7.B	8.B	9.C	10.D
11.A	12.B	13.C*	14.D	15.C	16.C	17.C	18.C	19.C	20.B*
21.C	22.D	23.A	24.A	25.B	26.A	27.A	28.B	29.C	30.B
31.D	32.A	33.B	34.D	35.B	36.B*	37.C	38.D	39.D	40.D
41.B	42.C	43.B	44.A	45.A	46.C	47.D	48.D	49.A	50.B
51.B	52.C	53.C	54.B	55.A	56.D	57.C	58.D	59.B	60.C
61.B	62.D	63.C	64.D	65.B	66.D	67.B	68.D	69.A	70.B
71.C	72.B	73.D	74.C	75.C	76.A	77.A	78.D	79.B	80.B
81.D	82.C	83.B	84.C	85.D	86.B	87.B	88.D	89.C	90.A
91.B	92.D	93.D	94.B	95.A	96.C	97.A	98.B	99.D	100.A
101.B	102.B	103.C	104.D	105.C	106.C	107.A	108.C	109.B	110.C
111.A	112.D	113.C	114.A	115.A	116.B	117.B	118.C	119.D	120.A