(BSM)

# B.Sc. (MATHEMATICS)

## *INSTRUCTIONS TO CANDIDATES*

1. Candidates should write their Hall Ticket Number only in the space provided at the top left hand corner of this page, on the leaflet attached to this booklet and also in the space provided on the OMR Response Sheet. **BESIDES WRITING, THE CANDIDATE SHOULD ENSURE THAT THE APPROPRIATE CIRCLES PROVIDED FOR THE HALL TICKET NUMBERS ARE SHADED USING H.B. PENCIL ONLY ON THE OMR RESPONSE SHEET. DO NOT WRITE HALL TICKET NUMBER ANY WHERE ELSE.**
2. Immediately on opening this Question Paper Booklet, check:
   (a) Whether **200** multiple choice questions are printed (**100** questions in Mathematics, **50** questions in Analytical Ability and **50** questions in Communicative English)
   (b) In case of any discrepancy immediately exchange the Question paper Booklet of same code by bringing the error to the notice of invigilator.
3. Use of Calculators, Mathematical Tables and Log books is not permitted.
4. **Candidate must ensure that he/she has received the Correct Question Booklet, corresponding to his/her branch of Engineering.**
5. **Candidate should ensure that the booklet Code and the Booklet Serial Number, as it appears on this page is entered at the appropriate place on the OMR Response Sheet by shading the appropriate circles provided therein using H.B. pencil only. Candidate should note that if they fail to enter the Booklet Serial Number and the Booklet Code on the OMR Response Sheet, their Answer Sheet will not be valued.**
6. **Candidate shall shade one of the circles 1, 2, 3 or 4 corresponding question on the OMR Response Sheet using H.B. Pencil only. Candidate should note that their OMR Response Sheet will be invalidated if the circles against the question are shaded using Black / Blue ink pen / Ball pen / any other pencil other than H.B. Pencil or if more than one circle is shaded against any question.**
7. One mark will be awarded for every correct answer. **There are no negative marks.**
8. The OMR Response Sheet will not be valued if the candidate :
   (a) Writes the Hall Ticket Number in any part of the OMR Response Sheet except in the space provided for the purpose.
   (b) Writes any irrelevant matter including religious symbols, words, prayers or any communication whatsoever in any part of the OMR Response Sheet.
   (c) Adopts any other malpractice.
9. Rough work should be done only in the space provided in the Question Paper Booklet.
10. No loose sheets or papers will be allowed in the examination hall.
11. Timings of Test: 10.00 A.M. to 1.00 P.M.
12. Candidate should ensure that he / she enters his / her name and appends signature on the Question paper booklet, leaflet attached to this question paper booklet and also on the OMR Response Sheet in the space provided. Candidate should ensure that the invigilator puts his signature on this question paper booklet, leaflet attached to the question paper booklet and also on the OMR Response Sheet.
13. Before leaving the examination hall candidate should **return both the OMR Response Sheet and the leaflet attached to this question paper booklet** to the invigilator. Failure to return any of the above shall be construed as malpractice in the examination. **Question paper booklet may be retained by the candidate.**
14. This booklet contains a total of **32** pages including Cover page and the pages for Rough Work.

## MATHEMATICS

1. If $\phi$ satisfies $2\frac{dy}{dx}+4y=x^2$ and $\psi$ satisfies $\frac{dy}{dx}+2y=x^3$ then $\phi+\psi$ satisfies

   (1) $3\frac{dy}{dx}+6y=x^2+x^3$ (2) $\frac{dy}{dx}+2y=x^2-x^3$

   (3) $2\frac{dy}{dx}+4y=x^2+2x^3$ (4) $\frac{dy}{dx}+2y=x^5$

2. If $\phi$ is a solution of $y'+iy=x$ with $\phi(0)=2$. Then $\phi(\pi)=$

   (1) $\pi$ (2) $-\pi$ (3) $i\pi$ (4) $-i\pi$

3. A solution of $y'=\frac{e^{x-y}}{1+e^x}$ is given by $y=$

   (1) $\log(1+e^x)$ (2) $\log\left(\left|\log\left(1+e^x\right)\right|\right)$

   (3) $1+e^x$ (4) $e^{1+e^x}$

4. The general solution of $(2x+2y-1)dy=(x+y+1)dx$ is given by

   (1) $\log|x+y|+x-2y=c$ (2) $\log|x+y|-x+2y=c$

   (3) $\log|x+y|+2x-y=c$ (4) $\log|x+y|-2x+y=c$ ($c$ is a constant)

5. The general solution of $y\,dx+\left(x+\frac{2y}{e^{xy}}\right)dy=0$ is

   (1) $e^{xy}-y^2=c$ (2) $e^{xy}+y^2=c$ (3) $e^{xy}-x^2=c$ (4) $e^{xy}+x^2=c$

6. The general solution of $y+2\left(\frac{dy}{dx}\right)^2=(x+1)\frac{dy}{dx}$ is

(1) $y+2c^2=(x+1)c$ (2) $y+2y^2=(x+1)y+c$

(3) $y+2y^4=(x+1)y^2+c$ (4) $y+2\sqrt{y}=(x+1)\sqrt{y}+c\,(y\geq 0)$ ($c$ is a constant)

7. The general solution of $\frac{dy}{dx}-\frac{dx}{dy}=\frac{x}{y}-\frac{y}{x}$ is given by

(1) $(xy-c_1)(x^2-y^2-c_2)=0$ (2) $(xy-c_1)(x^2+y^2-c_2)=0$

(3) $(x^2y^2-c_1)(x-y-c_2)-0$ (4) $(x^2y^2-c_1)(x+y+c_2)=0$

8. The singular solution of $p=\log(px-y)$, where $p=\frac{dy}{dx}$ is $y=$

(1) $(x+1)\log x$ (2) $(x-1)\log x$ (3) $x(\log x+1)$ (4) $x(\log x-1)$

9. The solution of $(x^2-y^2)\,dx=2xy\,dy$ is

(1) $x(x^2+3y^2)=c$ (2) $x(x^2-3y^2)=c$

(3) $x^2(x+3y)=c$ (4) $x^2(x+3y)=c$ ($c$ is a constant)

10. The integrating factor of $(x+1)\frac{dy}{dx}-y=e^{3x}(x+1)^2$ is

(1) $x+1$ (2) $(x+1)^2$ (3) $\frac{1}{x+1}$ (4) $\frac{1}{(x+1)^2}$

11. A solution of $(D^3+D^2+5D+5)y=0$ where $D=\frac{d}{dx}$ is

(1) $y=\sin x$ (2) $y=\cos x$ (3) $y=e^x$ (4) $y=e^{-x}$

12. Particular integral of $(D^2+5D+6)y=2\sinh x$ is

(1) $y=\frac{1}{12}(e^{-x}+6e^{x})$ (2) $y=\frac{1}{12}(e^{x}+6e^{-x})$

(3) $y=\frac{1}{12}(e^{-x}-6e^{-x})$ (4) $y=\frac{1}{12}(e^{x}-6e^{-x})$

13. The solution of $(D^2 - 2D - 3)\,y = 0$ is $y =$

(1) $c_1e^x + c_2e^{3x}$ (2) $c_1e^{-x} + c_2e^{-3x}$ (3) $c_1e^x + c_2e^{-3x}$ (4) $c_1e^{-x} + c_2e^{3x}$

14. The solution of $(D^2+4)\,y=0$ is given by $y =$

(1) $c_1e^{2x} + c_2e^{-2x}$ (2) $c_1e^{2x} - c_2e^{-2x}$

(3) $c_1\cos 2x + c_2 \sin 2x$ (4) $c_1\cos 4x + c_2 \sin 4x$

15. Particular integral of $(D-3)^2\,y=e^{3x}$ is

(1) $\frac{x^2}{2}e^{3x}$ (2) $\frac{x^2}{3}e^{3x}$ (3) $\frac{x^2}{3!}e^{3x}$ (4) $\frac{x}{2}e^{3x}$

16. The complementary function of $(D^2-2D+2)\,y = \sin x$ is

(1) $e^x(c_1 \cos x + c_2 \sin x)$ (2) $e^{-x}(c_1 \cos x + c_2 \sin x)$

(3) $e^{-x}(c_1 \sinh x + c_2 \cosh x)$ (4) $e^x(c_1 \cosh x + c_2 \sinh x)$

17. Particular integral of $(D^2+1)\,y = e^{2x} \cos 3x$ is $\frac{e^{2x}}{40}\phi(x)$ where $\phi(x) =$

(1) $3 \sin 3x + \cos 3x$ (2) $3 \sin 3x - \cos 3x$

(3) $\cos 3x - 3 \sin 3x$ (4) $-3 \sin 3x - \cos 3x$

18. The particular integral of $(D^2-1)\,y = x \sin x$ is

(1) $\frac{1}{2}(x \sin x + \cos x)$ (2) $\frac{1}{2}(\sin x + x \cos x)$

(3) $-\frac{1}{2}(x \sin x + \cos x)$ (4) $-\frac{1}{2}(\sin x + x \cos x)$

19. The differential equation $\left(\frac{dy}{dx}\right)^2 + xy^2 = 0$ is

(1) linear (2) homogeneous

(3) of second order (4) of second degree

20. The general solution of $\frac{d^2y}{dx^2} - 2\alpha\frac{dy}{dx} + \alpha^2 y = 0$ is such that one term contains $e^{\alpha x}$ then its second term contains a constant times

(1) $e^{-\alpha x}$ (2) $xe^{-\alpha x}$ (3) $xe^{\alpha x}$ (4) $\frac{x^2}{2}e^{\alpha x}$

21. The G.C.D of 396 and 128 is

(1) 2 (2) 4 (3) 6 (4) 8

22. If (a, b) = 1 then (a + b, a – b) is

(1) 2 (2) 3 (3) 4 (4) 5

23. If $F_n = 2^{2^n} + 1$ is the $n^{th}$ Fermat number then

(1) $F_3$ is composite (2) $F_4$ is composite
(3) $F_5$ is composite (4) $F_2$ is composite

24. The congruence $5x \equiv 3 \pmod{24}$ has

(1) no solution (2) two solutions
(3) infinite number of solutions (4) unique solution

25. If $n$ is an integer $\geq 2$ and $(n-1)! \equiv -1 \pmod{n}$ then $n$ is

(1) 2 (2) composite (3) a prime (4) a square

26. $\div$ is a binary operation on

(1) set of positive integers (2) set of integers
(3) set of rational numbers (4) set of non-zero rationals

27. The number of binary operations on a set of $n$ elements is

(1) $n^n$ (2) $n^{n^2}$ (3) $(n^2)^n$ (4) $(n^n)^n$

28. In the group $(I,\circ)$ where $I$ is the set of integers and $a \circ b = a+b+1$ for all $a,b$ in $I$. The identity element is

(1) 0 (2) 1 (3) $-1$ (4) $-2$

29. If every element of the group G is its own inverse then G is

(1) non abelian (2) abelian (3) cyclic (4) the trivial group $\{0\}$

30. If $A$ and $B$ are subgroups of a group G then $A \cup B$

(1) is an abelian subgroup of G (2) is a non-abelian subgroup of G
(3) need not be a subgroup of G (4) is equal to G

31. If $\alpha = (2\ 5\ 3)\ (4\ 7)\ (1\ 0\ 9\ 8)$ is a permutation of the set $\{1,2,3,4,5,6,7,8,9\}$ then its order is

(1) 3 (2) 6 (3) 9 (4) 12

32. In the group $(S_3, \bullet)$, the number of elements whose inverse is itself is

(1) 2 (2) 3 (3) 6 (4) 4

33. The number of generators in $(Z_{10}, +_{10})$ is

(1) 1 (2) 2 (3) 4 (4) 5

34. Every cyclic group of infinite order is isomorphic to

(1) multiplicative group of positive rationals
(2) additive group of integers
(3) additive group of even integers
(4) $S = \{1, -1\}$ with usual multiplication as binary operation

35. $\phi$ is a homomorphism of the group $G$ into the group $G'$ whose identity elements are $e$ and $e'$ respectively then

(1) $\phi(e) = e'$ and $\phi(x^{-1}) \neq \{\phi(x)\}^{-1}$ for all x in G
(2) $\phi(e) \neq e'$ and $\phi(x^{-1}) = \{\phi(x)\}^{-1}$ for all x in G
(3) $\phi(e) = e'$ and $\phi(x^{-1}) \neq \{\phi(x)\}^{-1}$ for some x in G
(4) $\phi(e) = e'$ and $\phi(x^{-1}) = \{\phi(x)\}^{-1}$ for all x in G

36. A homomorphism $\phi$ of a group $G$ into the group $G'$ is an isomorphism if
(1) $G'$ is a proper subgroup $G$ (2) $G$ is a proper subgroup of $G'$
(3) $\ker \phi$ is the identity element of $G$ (4) $\ker \phi$ is the identity element of $G'$

37. If aH and bH are two left cosets of a group G and $aH \neq bH$ then $aH \cap bH =$
(1) {a, b} (2) H (3) G (4) $\phi$

38. G is a finite group and H is a subgroup of G such that there is no other subgroup of G whose order is the order of H then H is
(1) abelian (2) cyclic (3) normal (4) G

39. If $N$, $M$ are the normal subgroups of a group $G$ then $NM/M$ is isomorphic to
(1). $MN/N$ (2) $N$ (3) $N/N \cap M$ (4) $M/N \cap M$

40. An automorphism of a group G is an isomorphism of G
(1) onto a proper subgroup of G (2) onto a super subgroup of G
(3) onto a trivial subgroup of G (4) onto G

41. If $\vec{a}$ is a constant vector and $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ then $\nabla(\vec{a}.\vec{r}) =$
(1) $\vec{0}$ (2) $\vec{a}$ (3) $\vec{r}$ (4) $\vec{i} + \vec{j} + \vec{k}$

42. If $\vec{r}$ is the position vector of an arbitrary point then $\nabla.\vec{r} =$
(1) 0 (2) 1 (3) 2 (4) 3

43. If $r = \left(x^2 + y^2 + z^2\right)^{1/2}$ then $\nabla^2\left(\frac{1}{r}\right) =$
(1) 0 (2) 1 (3) 2 (4) 3

44. The value of $n$ for which the vector $r^n\vec{r}$ where $r=|\vec{r}|$ is solenoidal is

(1) 0 (2) $-1$ (3) $-2$ (4) $-3$

45. The derivative of $\phi(x,y,z)=x^2-2xy+z^2$ at $(2,-1,1)$ in the direction of $\vec{i}-2\vec{j}+2\vec{k}$ is

(1) 6 (2) 4 (3) 2 (4) 1

46. The value of $\iint\left(x^2\vec{i}+y^2\vec{j}+z^2\vec{k}\right)dS$ over the faces of the cube given by $0\le x,y,z\le 1$ is

(1) 3 (2) 2 (3) 1 (4) 0

47. If $\vec{V}=\left(3x^2+6y\right)\vec{i}-14yz\vec{j}+20xz^2\vec{k}$ then $\int_C \vec{V}.dV$ where C is the straight line joining (0, 0, 0) and (1, 1, 1) is

(1) $\frac{10}{3}$ (2) $\frac{11}{3}$ (3) 4 (4) $\frac{13}{3}$

48. In the usual notation, if S is the surface of the unit sphere and $\int_S (ax\vec{i}+by\vec{j}+cz\vec{k}).\vec{n}\,dS=\frac{\lambda}{3}\pi(a+b+c)$ then $\lambda=$

(1) 2 (2) 4 (3) 1 (4) 3

49. The circulation of $\vec{F}(x,y,z)=y\vec{i}+z\vec{j}+x\vec{k}$ around the circle $x=\cos\theta$, $y=\sin\theta$ and $z=0$ is $\lambda\pi$ where $\lambda=$

(1) 0 (2) 1 (3) $-1$ (4) 3

50. The value of $\oint_c(2ydx+xdy)$ where C is $x^2+y^2=4$ is $\lambda\pi$ then $\lambda=$

(1) $-2$ (2) 2 (3) $-4$ (4) 4

51. A plane meets the coordinate axes at A, B, C respectively and the centroid of $\Delta ABC$ is $(a, b, c)$. If the equation to the plane is given by $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=\lambda$ then $\lambda =$

(1) 0 (2) 1 (3) 2 (4) 3

52. The sum of the intercepts made by the plane $2x - 3y - 6z = 1$ on the coordinate axes is

(1) 0 (2) 7 (3) $-7$ (4) 1

53. A variable plane passes through a fixed point $(a, b, c)$ and meets the coordinate axes at A, B, C respectively. If the locus of the point common to the planes through A, B, C and parallel to the coordinate planes is $\frac{a}{x}+\frac{b}{y}+\frac{c}{z}=\lambda$ then $\lambda =$

(1) 0 (2) 1 (3) 2 (4) 3

54. The planes $4x+3y-3z=5, 5x+5y-2z=10, 2x-y-5z=-5$ intersect

(1) at no point
(2) exactly at one point which is not the origin
(3) along a line
(4) intersect at origin only

55. The distance between the planes $ax+by+cz+d_1=0$ and $ax+by+cz+d_2=0$ is

(1) $\frac{d_1-d_2}{\sqrt{a^2+b^2+c^2}}$ (2) $\frac{d_2-d_1}{\sqrt{a^2+b^2+c^2}}$

(3) $\frac{|d_1-d_2|}{\sqrt{a^2+b^2+c^2}}$ (4) $|d_1-d_2|$

56. A plane passes through $(a, b, c)$ and intersects the coordinate axes at A, B, C respectively. The centre of the sphere OABC, O being the origin lies on $\frac{a}{x}+\frac{b}{y}+\frac{c}{z}=\lambda$ where $\lambda =$

(1) 0 (2) 1 (3) 2 (4) 3

57. If $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ $(d > 0)$ touches the coordinate axes then $(u, v, w) =$

(1) $\left(\sqrt{d}, \sqrt{d}, \sqrt{d}\right)$ (2) $\left(\sqrt{\frac{d}{2}}, \sqrt{\frac{d}{2}}, \sqrt{\frac{d}{2}}\right)$ (3) $\left(\sqrt{2d}, \sqrt{2d}, \sqrt{2d}\right)$ (4) $(0, 0, 0)$

58. If $lx + my + nz = p(\neq 0)$ and $l'x + m'y + n'z = p'(\neq 0)$ are conjugate planes with respective to $x^2 + y^2 = a^2(> 0)$ then $ll' + mm' + nn' = \lambda$ where $\lambda =$

(1) $\frac{a^2}{pp'}$ (2) $\frac{pp'}{a^2}$ (3) $\left|\frac{a}{pp'}\right|$ (4) $\left|\frac{pp'}{a}\right|$

59. If $r_1$, $r_2$ are the radii of two orthogonal spheres, then the radius of the circle of their intersection is

(1) $\frac{r_1 + r_2}{\sqrt{r_1^2 + r_2^2}}$ (2) $\frac{r_1 r_2}{\sqrt{r_1^2 + r_2^2}}$ (3) $\frac{\sqrt{r_1^2 + r_2^2}}{r_1 r_2}$ (4) $\frac{\sqrt{r_1^2 + r_2^2}}{r_1 + r_2}$

60. The centers of the spheres of a coaxial system lie on

(1) square (2) circle (3) sphere (4) straight line

61. The set of reals that satisfy $|2x + 3| \leq 11$ is

(1) $(-7, 4]$ (2) $[-7, 4]$ (3) $[-7, 4)$ (4) $(-7, 4)$

62. $\text{Inf}\left\{n - \frac{1}{n^2} + 3 : n \in Z^+\right\}$ is

(1) 4 (2) 3 (3) 5 (4) 0

63. The sequence $\{a_n\}$ defined by $a_n = \frac{1}{n+1} + \frac{1}{n+2} + - - - - + \frac{1}{n+n}$ for $n = 2, 3, \ldots\ldots$ is

(1) divergent (2) convergent
(3) oscillates finitely (4) oscillates infinitely

64. If $p, q$ are positive rationals and $\sum_{n=2}^{\infty} \frac{n^q}{(n+1)^p}$ converges then $p-q$ is

(1) 0 (2) $<0$ (3) in (0 1] (4) $>1$

65. $\sum_{n=1}^{\infty} \frac{(-1)^n x^n}{n}$ is convergent when $x$ is in

(1) [–1 1] (2) (–1 1] (3) [–1 1) (4) (–2 2)

66. If $f: R \to R$ is defined by $f(x) = \begin{cases} \frac{|x-1|}{x-1}, x \in R-\{1\} \\ 0 \quad when\, x=1 \end{cases}$ then $\underset{x\to 1}{Lt} f(x)$

(1) $=0$ (2) $=1$ (3) $\infty$ (4) does not exist

67. If f and g are such that $\underset{x\to a}{Lt}\{f(x)+g(x)\}$ exists then

(1) $\underset{x\to a}{Lt} f(x)$ and $\underset{x\to a}{Lt} g(x)$ exist (2) $\underset{x\to a}{Lt} f(x)$ only exists

(3) $\underset{x\to a}{Lt} g(x)$ only exists (4) $\underset{x\to a}{Lt} f(x)$ and $\underset{x\to a}{Lt} g(x)$ need not exist

68. If f:R $\to$ R is such that $f(x) = \begin{cases} x & \text{if } x \text{ is irrational} \\ -x & \text{if } x \text{ is rational} \end{cases}$ then $f$ is continuous

(1) on R (2) at rationals
(3) at irrationals (4) at (0, 0) only

69. The interval in which the equation $f(x) = x^3+x^2+3x-4=0$ has a real root is

(1) $\left[0 \quad \frac{1}{4}\right]$ (2) $\left[0 \quad \frac{1}{3}\right]$ (3) $\left[0 \quad \frac{1}{2}\right]$ (4) [0 1]

70. The function $f(x) = [x]$ for all $x \in R$ is continuous

(1) on $R$ (2) no where on $R$
(3) at integral value of $x$ (4) at non-integral value of $x$

71. If f is defined on R by $f(x) = |x-1|+|x|+|x+1|$ for all $x$ in $R$ then f is differentiable
(1) on $R$ (2) at $-1, 0, 1$ (3) on $R-\{-1,0,1\}$ (4) no where on R

72. If f is defined on $R$ and is such that $|f(x)-f(y)| \le |x-y|^{3/2}$ for all $x, y$ in $R$ then the function is
(1) strictly increasing (2) strictly decreasing
(3) constant (4) non-constant

73. If $f$ is an even function on $R$ and is differentiable at '0'. Then $f'(0) =$
(1) 0 (2) $\frac{1}{2}$ (3) $-\frac{1}{2}$ (4) 1

74. For the function $f(x)=\log(x^2+ab)-\log x(a+b)$ for all $x \in [a\ b]$ where $b > a > 0$, the point $c$ where $f'(c)=0$ is
(1) $\frac{a+b}{2}$ (2) $ab$ (3) $\sqrt{ab}$ (4) $b-a$

75. If $f, g$ are differentiable on $[0\ 1]$, $f'(x) \neq 0$ on $(0, 1)$ and $f(0) = 2, g(0) = 1, f(1) = 6, g(1) = 2$ such that there is a $c \in (0\ 1)$ with $\frac{g'(c)}{f'(c)}=\lambda$ then $\lambda =$
(1) 0 (2) 1 (3) 2 (4) $\frac{1}{4}$

76. If $f$ is integrable on $[a\ b]$ then f on $[a\ b]$ is
(1) differentiable (2) continuous (3) discontinuous (4) bounded

77. If $f:[0\ 2] \to R$ is defined by $f(x) = 1$ for $x \neq 1$ and $f(1) = 5$ then $\int_0^2 f(x)\,dx =$
(1) 1 (2) 2 (3) 5 (4) 10

78. If $f(x)=\frac{1}{2^n}$ when $\frac{1}{2^{n+1}} < x \le \frac{1}{2^n}$ $(x=0, 1, 2 \ldots\ldots)$ and $f(0) = 0$ then $\int_0^1 f(x)\,dx =$
(1) 0 (2) $\frac{1}{3}$ (3) $\frac{2}{3}$ (4) 1

79. The value of $\int_0^4 [x]dx$ is

(1) 2 (2) 4 (3) 6 (4) 8

80. $\int_0^1 \left\{1+\sum_{n=1}^{\infty}\frac{(-2x)^n}{n!}\right\}e^{2x}\,dx =$

(1) 0 (2) 1 (3) 2 (4) $e^2$

81. R is a ring with unity 1 and zero element 0. If $x$ is a non-zero element in R such that there is a unique $y$ in R with $xyx = x$ then

(1) $xy = 1 = yx$ (2) $xy = 1 \neq yx$ (3) $xy \neq 1 = yx$ (4) $xy \neq 1 \neq yx$

82. The characteristic of the residue classes modulus 8 is

(1) 1 (2) 2 (3) 4 (4) 8

83. The number of zero divisors in a field is

(1) 0 (2) 1 (3) $\infty$ (4) 2

84. In the ring $(Z_6, +_6, \bullet_6)$, an idempotent element is

(1) $\bar{2}$ (2) $\bar{0}$ (3) $\bar{3}$ (4) $\bar{5}$

85. If $R_1$, $R_2$ are subrings of a ring $R$ then $R_1 \cup R_2$ is subring of $R$ if

(1) $R_1 \cap R_2 = \{0, 1\}$ (2) $R_1 \subseteq R_2$

(3) $R_2 \subseteq R_1$ (4) either $R_1 \subseteq R_2$ or $R_2 \subseteq R_1$

86. An example of a non-commutative ring is

(1) The set of integers with usual addition and multiplication

(2) $(Z_5, +_5, \bullet_5)$

(3) The set of rationals with usual addition and multiplication

(4) The set of 2x2 matrices with usual addition and multiplication

87. $R$, $R'$ are rings and $f: R \to R'$ is a homomorphism and $V$ is an ideal in $R$. Then $f(V)$
(1) $= R'$ (2) is an ideal in $R'$
(3) is an ideal in $f(R)$ (4) is empty

88. Any homomorphism from a field into a ring is
(1) the zero homomorphism
(2) an isomorphism
(3) either the zero homomorphism or an isomorphism
(4) an endomorphism

89. If f(x), g(x) are two non-zero polynomials of F[x], where F is a nontrivial field then deg (f(x)g(x)) is
(1) = (deg f(x)) (deg g(x)) (2) < (deg f(x)) (deg g(x))
(3) = (deg f(x)) + (deg g(x)) (4) < (deg f(x)) + (deg g(x))

90. In the field of residue classes modulo 7, the remainder when $f(x) = x^2+2x+5$ is divided by $x-4$ is
(1) 0 (2) 1 (3) 2 (4) 5

91. If $W_1$ and $W_2$ are two subspaces of a vector space then the linear span $L(W_1 \cup W_2) =$
(1) $W_1$ (2) $W_2$ (3) $W_1+W_2$ (4) $W_1 + W_2 - W_1 \cap W_2$

92. In the usual notation, if the vectors $(x_1, y_1)$ and $(x_2, y_2)$ of $V_2(F)$ are linearly dependent then
(1) $x_1x_2+y_1y_2=0$ (2) $x_1y_2-x_2y_1=0$ (3) $x_1y_1+x_2y_2=0$ (4) $x_1y_1-x_2y_2=0$

93. If $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ and $T$ be the linear operator on $R^2$ defined by $T(x)= Ax$ $(x \in R^2)$ is written as a column vector then the matrix of $T$ relative to the standard basis $\{(1,0), (0,1)\}$ is
(1) $\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ (2) $\begin{bmatrix}1 & 3\\ 2 & 4\end{bmatrix}$ (3) $\begin{bmatrix}4 & 2\\ 3 & 1\end{bmatrix}$ (4) $\begin{bmatrix}4 & 3\\ 2 & 1\end{bmatrix}$

94. If $A.B$ are idempotent matrices such that $A.B = B.A$ then
(1) $A+B$ is idempotent (2) $A.B$ is idempotent
(3) $A+B+A.B$ is idempotent (4) $A+B-A.B$ is idempotent

95. If A, B are square matrices each of order n then nullity (AB)–{nullity (A)+nullity(B)}
(1) $=0$ (2) $\geq 0$ (3) $\leq 0$ (4) = Rank (AB)

96. If A is a $mXn$ matrix with rank q then the number of linearly independent solutions of the linear system $AX = 0$ is
(1) 2q (2) n–q (3) m–q (4) |n–m|

97. If $\omega$ is a cube root of unity then $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega^2 & 1 & \omega \\ \omega & \omega^2 & 1 \end{vmatrix}$ is
(1) $\omega$ (2) $\omega^2$ (3) 1 (4) 0

98. The eigenvalues of $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ are
(1) 1,4 (2) 1,6 (3) 2,5 (4) 1,2

99. If $u, v$ are orthogonal unit vectors then $\|u - v\| =$
(1) 0 (2) 1 (3) 2 (4) $\sqrt{2}$

100. In an inner product space, any orthogonal set of non-zero vectors
(1) is linearly dependent (2) is linearly independent
(3) contains only one vector (4) does not exist

Set Code : T2

Booklet Code : A

## ANALYTICAL ABILITY

For questions numbered **101** to **110** questions followed by data in the form of two statements are labeled as I and II. You must decide whether the data given in the statements are sufficient to answer the questions. Using the data make an appropriate choice from 1 to 4 as per the following guidelines.

(1) If the data I alone is sufficient to answer the question, then (1) is the correct answer.

(2) If the data II alone is sufficient to answer the question, then (2) is the correct answer.

(3) If the data I and II both are sufficient to answer the question, then (3) is the correct answer.

(4) If the data I and II both are not sufficient to answer the question, then (4) is the correct answer.

101. What is the price of a table?

I : The total price of 3 chairs and 5 tables is Rs. 18,800

II : The total price of 6 chairs and 4 tables is Rs. 20,800

102. What was the speed of a running train A?

I : The relative speed of train A and another train B running in opposite direction is 160 kmph.

II : The train B crosses a signal post in 9 seconds.

103. What is the difference between the two digits in a two-digit number?

I : The sum of the two digits is 8

II : 1/5 of that number is 15 less than ½ of 44.

104. What is the monthly income of Q?

I : Q earns Rs.6000 more than R, who earns Rs. 3000 less than P

II : The total monthly income of P and Q is Rs. 27000

105. What is the ratio of the number of boys and girls in a school?

I : Number of boys is 40 more than the girls

II : Number of girls is 80 percent of the number of boys

106. How many children are there in the group?

I : Average age of this group is 16 years. The total of ages of all the children in the group is 240 years.

II : The total of ages of all the children in the group and the teacher is 26.2 years. The teacher's age is six years more than the average age of the children.

107. What is the cost of polishing the rectangular floor?

I : Room is 9 m long and 7 m wide.

II : Cost of polishing the floor of 10 m by 5 m is Rs. 112.50.

108. How long will it take to fill a tank?

I : One pipe can fill the tank completely in 3 hours.

II : Second pipe can empty the tank in 2 hours.

109. What is Sudha's present age?

I : Sudha's present age is five times her son's present age.

II : Five years ago her age was twenty-five times her son's age at that time.

110. A, B and C can do a work in 30 days. In what time will A alone complete the work?

I : A and B together can do the work in 60 days.

II : C alone can do the work in 60 days.

Questions **111** to **115** : Find out the next term of the given series.

111. 2, 5, 9, 14, 20, ——

(1) 25 (2) 26 (3) 27 (4) 28

112. 53, 48, 50, 50, 47, ——

(1) 52 (2) 46 (3) 53 (4) 51

113. 0, 7, 26, 63, ——

(1) 124 (2) 126 (3) 215 (4) 217

114. 8, 13, 22, 35, ——
(1) 45 (2) 52 (3) 50 (4) 65

115. 97, 86, 73, 58, 41, ——
(1) 54 (2) 55 (3) 56 (4) 20

Questions **116** to **120** : Find the missing term of the given series.

116. 5, 10, 13, 26, 29, 58, 61, ——
(1) 122 (2) 64 (3) 125 (4) 128

117. 1, 3, 9, 31, ?, 651
(1) 97 (2) 127 (3) 129 (4) 109

118. 2, 7, 23, ?, 220, 665
(1) 78 (2) 72 (3) 70 (4) 71

119. 3, 15, 75, ?, 1875, 9375
(1) 375 (2) 125 (3) 250 (4) 625

120. 9, 16, 25, ?, 49, 64
(1) 29 (2) 26 (3) 36 (4) 40

Questions **121** to **125** : Find out the Odd number of the series.

121. 4, 11, 21, 34, 49, 69, 91
(1) 69 (2) 49 (3) 34 (4) 21

122. 8, 17, 37, 79, 165, 338, 689
(1) 17 (2) 79 (3) 165 (4) 338

123. 13, 15, 19, 25, 33, 41, 55
(1) 15 (2) 19 (3) 25 (4) 41

124. 2, 3, 6, 12, 45, 157.5, 630
(1) 45 (2) 3 (3) 157.5 (4) 12

125. 3, 4, 10, 33, 148, 685, 4116
(1) 685 (2) 10 (3) 4 (4) 148

Directions (Q.**126** to **130**) : Study the following information carefully and answer the questions given below:

Seasonwise Consumption of Fertilizers (000 tonns of nutrients)

| | | | | Percent Share | |
|---|---|---|---|---|---|
| Year | Kharif | Rabi | Total | Kharif | Rabi |
| 1996-97 | 6920 | 7388 | 14308 | 48.4 | 51.6 |
| 1997-98 | 8092 | 8096 | 16188 | 50.0 | 50.0 |
| 1998-99 | 7834 | 8964 | 16798 | 46.6 | 53.4 |
| 1999-00 | 9304 | 9841 | 19145 | 48.6 | 51.4 |

126. The consumption of fertilizers was almost equal during both the seasons in the year
(1) 1996-97 (2) 1997-98 (3) 1998-99 (4) 1999-2000

127. Maximum consumption of fertilizers was during
(1) 1998-99 (2) 1996-97 (3) 1999-2000 (4) 1997-98

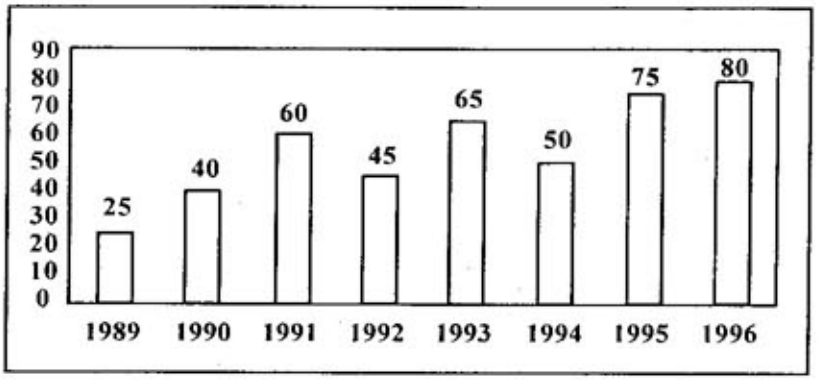
128. The percent share in the consumption of fertilizers during 1996-2000 was
(1) Less for Kharif (2) Less for Rabi
(3) Equal for both the seasons (4) Inadequate data

129. Which season has shown consistent increase in the consumption of fertilizers over the period 1996-2000
(1) Kharif (2) Rabi (3) Both (4) None

130. The difference between the consumption of fertilizers in both the seasons is minimum during
(1) 1996-97 (2) 1997-98 (3) 1998-99 (4) 1999-2000

Directions (Q.**131** to **135**) : Study the following graph carefully and answer the questions given below:

Production of food grain by a state over the years (1000 tonnes)




131. The average production of 1990 and 1991 was exactly equal to the average production of which of the following pairs of years?
(1) 1989 & 92 (2) 1989 & 95 (3) 1993 & 94 (4) 1994 & 95

132. What is the difference in the production of food grains between 1991 & 1994
(1) 10,000 tonnes (2) 15,000 tonnes (3) 500 tonnes (4) 5,000 tonnes

133. In which of the following years was the percentage increase on production from the previous year the maximum among the given years?
(1) 1991 (2) 1993 (3) 1995 (4) 1990

134. In how many of the given years was the production of foodgrain more than the average production of the given years?
(1) 2 (2) 3 (3) 4 (4) 1

135. What was the percentage drop in the production of foodgrain from 1991 to 1992?
(1) 15 (2) 20 (3) 25 (4) 30

136. If cook is called butler, butler is called manager, manager is called teacher, teacher is called clerk and clerk is called principal, who will teach in a class?
(1) manager (2) butler (3) teacher (4) clerk

137. Fire : Ashes :: Explosion :?
(1) sound (2) debris (3) fury (4) flame

138. In a certain code FICTITIOUS is written as IFTCTIOISU. How is POSTPONE written in that code?
(1) OPSTOPEN (2) PSOPTNOE (3) POTSOPEN (4) OPTSOPEN

139. What would be the next term in the following series? P3C, R5F, T8I, V12L, _____
(1) Y17O (2) X17M (3) X17O (4) X16O

140. Deepak said to Nitin, 'That boy playing with football is the younger of the two brothers of the daughter of my father's wife'. How is the boy playing football related to Deepak?
(1) Son (2) brother (3) cousin (4) nephew

141. Choose the number which is different from other in the group
(1) 48 (2) 12 (3) 36 (4) 58

142. If in a certain code, SWITCH is written as TVJSDG, which word would be written as CQFZE
(1) BREAD (2) BARED (3) BRAED (4) BRADE

143. If GIVE is coded as 5137 and BAT is coded as 924 how is GATE coded?
(1) 5427 (2) 5724 (3) 5247 (4) 2547

144. Find the missing term
AYD BVF DRH ? KGL
(1) FMI (2) GMJ (3) HLK (4) GLJ

145. Six persons M, N, O, P, Q and R are sitting around a table. N is between R and O, M is between Q and P, R is to the left of P. Who is between M and R?
(1) M (2) N (3) P (4) Q

Set Code : T2

Booklet Code : A

146. If 3rd of a month is 3 days after Sunday, what will be the day on the 15th of the same month?

(1) Wednesday (2) Tuesday (3) Sunday (4) Monday

147. How many times do the hands of a clock coincide in a day?

(1) 24 (2) 20 (3) 21 (4) 22

148. If in a certain language 943 is coded as BED and 12448 is coded as SWEET. How is 492311 coded in that language?

(1) EDSWBS (2) TSWBDD (3) DSWTEE (4) EBWDSS

149. If '+' means '÷', '–' means '+', '×' means '–', '÷' means '×' then $16 \div 8 - 12 + 6 \times 8 = ?$

(1) 120 (2) 122 (3) 124 (4) 128

150. Anthropology is related to man in the same way as Anthology is related to

(1) nature (2) apes (3) poems (4) flowers

Set Code : T2

Booklet Code : A

## COMMUNICATIVE ENGLISH

151. Fill in the blank with the correct article from the given options:

_____ school is very cold. Hasn't it got _____ central heating system?

It has, but _____ central heating is broken down.

(1) the, a, the (2) a, the, the (3) an, the, the (4) the, the, a

152. Fill in the blanks with the correct article from the given options:

_____ attempt has been made to collect funds to start _____ public library in _____ town where I live.

(1) the, a, the (2) an, a, the (3) an, the, a (4) a, an, the

153. Complete the sentence with the right preposition from the options given below:

A university is where you study _____ a degree.

(1) to (2) of (3) from (4) for

154. Complete the sentence with the right preposition from the options given below:

Even the new drug could not cure him _____ his illness.

(1) from (2) by (3) of (4) on

155. Use the correct form of the tense given in the options to fill in the blank:

As soon as he _____ (finish) his exams, he went to Paris for a month.

(1) had been finished (2) had finished

(3) has finished (4) would have finished

156. Use the correct form of the tense given in the options to fill in the blank:

You _____ energy if you switched off the lights more often.

(1) would save (2) would have saved

(3) had saved (4) will save

157. Choose the right option to fill in the blank to convert the active sentence into a passive one.
Michael has not sent me a text message.
I _____ a text message.
(1) have not sent (2) have not been sent
(3) has not been sending (4) had not been sent

158. Choose the best word in the following to make the sentence complete.
Neither the director nor the actors _____ following the lines closely.
(1) are (2) is (3) were (4) are not

159. Choose the best word in the following to make the sentence complete.
Every one of the clerks _____ applied for casual leave today.
(1) have (2) has (3) is (4) had

160. Choose the correct question tag for the following.
They are repairing the old bridge now, _____?
(1) are they? (2) have they? (3) aren't they? (4) weren't they?

161. Identify the synonym for the word ABSURD.
(1) reasonable (2) sensible (3) ridiculous (4) convenient

162. Identify the synonym for the word NOVICE.
(1) beginner (2) connoisseur (3) expert (4) veteran

163. Identify the antonym for the word ACQUIT.
(1) release (2) control (3) exonerate (4) condemn

164. Identify the antonym for the word RECEDE.
(1) leave (2) abscond (3) advance (4) retreat

Set Code : T2

Booklet Code : A

165. Choose the one, which can be substituted for the given words/sentence.
The period between two reigns
(1) anachronism (2) interregnum (3) gap (4) stasis

166. Choose the one, which can be substituted for the given words/sentence.
One who has an irresistible tendency to steal
(1) stevedore (2) heretic (3) iconoclast (4) kleptomaniac

167. Choose a suffix/prefix to fill in the blank with the right form of the word given in the bracket:
The school has been given money to _____ the class rooms. (modern)
(1) ity (2) ising (3) ize (4) un

168. Fill in the blank with the right word:
As soon as it saw us, the bird _____ away.
(1) flue (2) flew (3) flu (4) flown

169. Fill in the blanks with the right word from the words often confused:
The film starts in a graveyard, an _____ image for the decaying society which is the theme of the film.
(1) adversary (2) apposite (3) opposite (4) appal

170. Fill in the blanks with the right word from the words often confused:
We can't afford to become _____ about any of our products.
(1) complacent (2) complaisant (3) complement (4) compliment

171. Identify which part of the sentence is wrong:
Every one of the survivors/of the ill-fated aircraft/have told/the same story.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

172. Identify which part of the sentence is wrong:
Prajna was unhappy/to hear the news/of her son's failing/in the examination.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

173. Identify which part of the sentence is wrong:
I enjoyed/during my/stay in/England.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

174. Identify which part of the sentence is wrong:
The film show/began/when we arrived/in the hall.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

175. Identify which part of the sentence is wrong:
The production of/different kinds of artificial materials/are essential to the conservation of/our
1 2 3
natural resources
4
(1) 1 (2) 2 (3) 3 (4) 4

176. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.
He could not *look* anything in the dark room.
(1) look at (2) see (3) see through (4) watch through

177. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.
Please make it a point to send your letter *at my address.*
(1) on my address (2) in my address
(3) upon my address (4) to my address

165. Choose the one, which can be substituted for the given words/sentence.
The period between two reigns
(1) anachronism (2) interregnum (3) gap (4) stasis

166. Choose the one, which can be substituted for the given words/sentence.
One who has an irresistible tendency to steal
(1) stevedore (2) heretic (3) iconoclast (4) kleptomaniac

167. Choose a suffix/prefix to fill in the blank with the right form of the word given in the bracket:
The school has been given money to _____ the class rooms. (modern)
(1) ity (2) ising (3) ize (4) un

168. Fill in the blank with the right word:
As soon as it saw us, the bird _____ away.
(1) flue (2) flew (3) flu (4) flown

169. Fill in the blanks with the right word from the words often confused:
The film starts in a graveyard, an _____ image for the decaying society which is the theme of the film.
(1) adversary (2) apposite (3) opposite (4) appal

170. Fill in the blanks with the right word from the words often confused:
We can't afford to become _____ about any of our products.
(1) complacent (2) complaisant (3) complement (4) compliment

171. Identify which part of the sentence is wrong:
Every one of the survivors/of the ill-fated aircraft/have told/the same story.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

172. Identify which part of the sentence is wrong:
Prajna was unhappy/to hear the news/of her son's failing/in the examination.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

173. Identify which part of the sentence is wrong:
I enjoyed/during my/stay in/England.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

174. Identify which part of the sentence is wrong:
The film show/began/when we arrived/in the hall.
1 2 3 4
(1) 1 (2) 2 (3) 3 (4) 4

175. Identify which part of the sentence is wrong:
The production of/different kinds of artificial materials/are essential to the conservation of/our
1 2 3
natural resources
4
(1) 1 (2) 2 (3) 3 (4) 4

176. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.
He could not *look* anything in the dark room.
(1) look at (2) see (3) see through (4) watch through

177. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.
Please make it a point to send your letter *at my address.*
(1) on my address (2) in my address
(3) upon my address (4) to my address

178. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.

I hope you won't object *to me watching* while you work.

(1) me to watch
(2) to my watching
(3) against me watching
(4) to watch

179. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.

The dissidents *hold* a great problem in every political party.

(1) try (2) give (3) cause (4) pose

180. Choose the correct alternative to replace the *italicised and underlined* part, which may improve the sentence.

My *opinion for* the film is that it will bag the national award.

(1) opinion about (2) opinion on (3) opinion to (4) opinion of

181. Choose the exact meaning of the idioms/phrases:

He *burnt his fingers* by interfering in his neighbor's affair.

(1) got himself insulted
(2) got himself into trouble
(3) burnt himself
(4) goy rebuked

182. Choose the exact meaning of the idioms/phrases:

I am just *a small fry* in the office.

(1) peon
(2) a small creature
(3) humorous
(4) person of little importance

183. Fill in the blank with the correct phrasal verb given below:

Our car _____ and we had to push it off the road.

(1) broke away (2) broke down (3) broke in (4) broke off

184. Fill in the blank with the correct phrasal verb given below:
The maid will _____ your room later.
(1) make over (2) make out (3) make up (4) make with

185. Fill in the blank with the correct phrasal verb given below:
As house prices have _____ recently many are planning to buy one.
(1) come down (2) come out (3) come up (4) come away

To answer the questions **186-190**, read the following passage carefully and choose the appropriate option.

Mark Hughes is a master of the fine art of survival. His Los Angeles-based Herbalife International Inc. is a pyramid outfit that peddles weight-loss and nutrition concoctions of dubious value. Bad publicity and regulatory crackdowns hurt his U.S. business in the late 1980s.

Contributing to Hughes' woes, Herbalife's chief counsel, David Addis, quit in January. Before packing up, he reportedly bellowed at Hughes, "I can't protect you anymore." Trouble on the home front, too. On a recent conference call with distributors, Hughes revealed he's divorcing his wife whose beaming and perky image adorns much of Herbalife's literature.

Meanwhile, in a lawsuit that's been quietly moving through Arizona's Superior Court, former Herbalife distributor Daniel Fallow of Sandpoint charges that Herbalife arbitrarily withholds payment to distributors and marks up its products over seven times the cost of manufacturing. Randy Cox of Lewiston, Idaho also says, "Herbalife destroyed my business". Will Hughes survive again?

186. Herbalife Inc is baded in:
(1) Austin (2) Columbus (3) New York (4) Los Angels

187. Daniel Fallow:
(1) was a former attorney for Hughes (2) was a former distributor of Herbalife
(3) Co-founded Herbalife (4) ran Herbalife's German unit

188. The complaint of Randy Cox of Lewiston, Idaho, against Herbalife was:
(1) The company did not treat them properly
(2) The products supplied by Hughes were inferior
(3) Herbalife destroyed his business
(4) Hughes has connections with the Russian mafia

189. Who says to Hughes, "I can't protect you anymore?

(1) Randy Cox of Lewiston (2) David Addis
(3) Daniel Fallow (4) David Fallow

190. The word bellow is closest in meaning to :

(1) shout (2) whisper (3) sigh (4) moan

191. Choose the correct option which gives meaningful sentence.

environmental and psychological stress and strain/he said that/the development of positive
A B C
attitude to cope with/ what the world needed today was.
D

(1) ABCD (2) BCDA (3) CBAD (4) BDCA

192. Choose the correct option which gives meaningful sentence.

four degrees below normal/icy winds lashed Srinagar/with minimum temperature registering/
A B C
which was already in the grip of grueling cold wave conditions
D

(1) ADBC (2) DABC (3) BDCA (4) CDAB

93. Choose the correct option which gives meaningful sentence.

his entire life/the social worker devoted/of the people of his village//to the upliftment.
A B C D

(1) ABCD (2) CDAB (3) CBAD (4) BADC

94. Choose the correct option which gives meaningful sentence.

at the earliest opportunity/having heard of the palmist/I decided to call on him/before I came
A B C
into town.
D

(1) ABCD (2) BADC (3) CBAD (4) BDCA

Set Code : T2

Booklet Code : A

195. Choose the correct option which gives meaningful sentence.

and find a suitable occasion for presenting them/organize a collection/what usually happens is

A B C

that two or three persons/and then choose the gifts.

D

(1) CBDA (2) ACBD (3) CBAD (4) BDCA

196. Could you say it again more slowly?

(1) Requesting (2) Seeking permission

(3) Apologising (4) Commanding

197. Excuse me if I'm out of line, but your work has not been adequate lately.

(1) Requesting (2) Seeking permission

(3) Apologising (4) Complaining

198. Could I borrow your dictionary?

(1) Requesting (2) Seeking permission

(3) Apologising (4) Commanding

199. I know I shouldn't have made those remarks about your work and I hope you now know how deeply I regret what I said.

(1) Requesting (2) Seeking permission

(3) Apologising (4) Commanding

200. How about going to Hawaii for your vacation?

(1) Requesting (2) Suggesting

(3) Apologising (4) Complaining