FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION
H-8/4, ISLAMABAD

No.1-2/FBISE/RES/599 18 July, 2024

NOTIFICATION

In continuation to this office Notifications No.1-2/FBISE/RES/CC/391 dated 21 June 2023 the Model Question Paper for the subject of Mathematics at HSSC-II level as per Curriculum 2006 alongwith Table of Specifications (TOS) and Alignment Chart is prepared for the Annual Examinations 2025 only and uploaded on the weblink https://www.fbise.edu.pk/curriculum_model_paper.php. It is pertinent to mention here that with effect from Annual Examinations 2026 and onwards Paper of Mathematics HSSC-II will be assessed as per Curriculum 2022-23.

(SYED ZULFIQAR SHAH)
Deputy Secretary
(Research & Academics)
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Heads of all Institutions affiliated with FBISE
at HSSC level

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Federal Board HSSC-II Examination
Model Question Paper Mathematics
(Curriculum 2006)

ROLL NUMBER					
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Version No.			
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1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Section - A (Marks 20)

Time Allowed: 25 minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. *Do not use lead pencil.*

Candidate Sign. _____ **Invigilator Sign. _____**

Q1. Fill the relevant bubble against each question. Each part carries one mark.

Sr no.	Question	A	B	C	D	A	B	C	D
i.	If $f(x,y) = cosx.e^{xy}$ then $\frac{\partial f}{\partial x}+\frac{\partial f}{\partial y}$ evaluate :	$e^{\pi y}(\pi cosx - sinx)$	$e^{\pi y}(\pi cosx + sinx)$	$e^{\pi y}(sinx - \pi cosx)$	$e^{\pi}(\pi cosx - sinx)$	○	○	○	○
ii.	The range of the function $f(x) = \lvert x-5\rvert$ is:	$(-\infty, 0]$	$[0, +\infty)$	$[5, +\infty)$	$[-5, +\infty)$	○	○	○	○
iii.	What limit given in the following results $\frac{\text{Sin}(1-x)}{(1-x)} = 1$?	$x \to -1$	$x \to 0$	$x \to 1$	$x \to \infty$	○	○	○	○
iv.	What is the derivative of $log_5 e^x$ $w.r.t.x$?	$\frac{1}{xlog5}$	$\frac{1}{xln5}$	$x \log_5 e$	$xlne$	○	○	○	○
v.	What is the value of $\sqrt{1-x^2}\frac{dy}{dx}(\sin^{-1}x + \text{Cos}^{-1}x)$?	2	0	$\sqrt{1-x^2}$	$\frac{1}{x}$	○	○	○	○
vi.	Which of the following represents $(y_2 + y)$, if $y = cosx$?	$-y$	0	y	$2y$	○	○	○	○
vii.	If $\vec{F}(t) = (t+5)\underline{i} + (2t^3)\underline{j} - (3t)\underline{k}$, then what is the evaluated value of $\lim_{t\to -2}\vec{F}(t)$?	$3\underline{i} + 8\underline{j} - 6\underline{k}$	$3\underline{i} - 16\underline{j} - 6\underline{k}$	$3\underline{i} - 16\underline{j} + 6\underline{k}$	$7\underline{i} + 16\underline{j} + 6\underline{k}$	○	○	○	○
viii.	For a velocity vector $\vec{v} = cos(t)\underline{i} - 2sin(t)\underline{j} + 3\underline{k}$, the acceleration vector $\vec{a}$ is:	$sin(t)\underline{i} + 2cos(t)\underline{j} + 3\underline{k}$	$sin(t)\underline{i} - 2cos(t)\underline{j} + 3\underline{k}$	$-sin(t)\underline{i} + 2cos(t)\underline{j}$	$-sin(t)\underline{i} - 2cos(t)\underline{j}$	○	○	○	○

ix.	For what value of k, the integral $\int_1^k x^{n-1}\,dx = \frac{1}{n}$? ; $n \in Z$	$\sqrt[n]{\frac{2}{n}}$	$\sqrt[n]{2}$	2^n	$\sqrt[n]{\frac{2n-1}{n}}$	○ ○ ○ ○
x.	What is the evaluated value of $\int_0^{2\pi} Sinx\,dx$?	-2	0	2	4	○ ○ ○ ○
xi.	For what values of x, the distance between the points $(7,1)$ and $(3,x)$ is 5?	$4,-2$	$-4,2$	$4,2$	$-4,-2$	○ ○ ○ ○
xii.	The three lines defined by the equations $x+2y=0, 2x+y=0, 3x+5y=0$ are:	sides of a triangle	Perpendicular	concurrent	parallel	○ ○ ○ ○
xiii.	Which one of the following is an equation of a circle with center $(3,-7)$ and goes through a point (1, 1)?	$(x+3)^2+(y-7)^2=52$	$(x-3)^2+(y+7)^2=68$	$(x-3)^2+(y+7)^2=32$	$(x+3)^2+(y-7)^2=40$	○ ○ ○ ○
xiv.	What is the length of tangent drawn from an external point $(-1,2)$ to the circle $2x^2+2y^2-4x+8y=0$?	17	$\sqrt{3}$	5	$\sqrt{5}$	○ ○ ○ ○
xv.	Which one of the following represents a parabola with focus $(5,0)$ and vertex $(0,0)$?	$x^2=20y$	$x^2=-20y$	$y^2=-20x$	$y^2=20x$	○ ○ ○ ○
xvi.	Equations of the asymptotes of a hyperbola $\frac{x^2}{7^2}-\frac{y^2}{4^2}=1$ are:	$y=\pm\frac{4}{7}$	$y=\pm\frac{7}{4}$	$x=\pm\frac{4}{7}$	$x=\pm\frac{7}{4}$	○ ○ ○ ○
xvii.	What is the order and degree of the differential equation $\frac{d^3y}{dx^3}-\sin^{-1}\left(\frac{d^2y}{dx^2}\right)=x^4e^x$?	3, 4	3, 2	3, 1	3, not defined	○ ○ ○ ○
xviii.	What is the solution of the differential equation$xdy-ydx=0$?	$y=cx$	$y=ce^x$	$x-y=c$	$xy=c$	○ ○ ○ ○
xix.	The positive root of $3t-cost-1$ by using the Regula-Falsi method and correct to 3 decimal places are:	0.507	0.670	0.570	0.607	○ ○ ○ ○
xx.	If $f(0)=1, f(1)=2.72$ then, what is the approximated value of $\int_0^1 f(x)dx$ by using the trapezoidal rule?	1.86	1.88	1.87	1.72	○ ○ ○ ○

Federal Board HSSC-II Examination
Model Question Paper Mathematics
(Curriculum 2006)

Time allowed: 2.35 hours Total Marks: 80

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the **E-sheet**. Write your answers on the allotted/given spaces.

SECTION – B (Marks 48)

$(12 \times 4 = 48)$

Q.2	Question	Marks		Question	Marks
i.	Find the value of z if $f(x)$ is continuous at $x=1$ and $f(x)=\begin{cases}\frac{\sqrt{3x+9}-\sqrt{2x+8}}{x-1} & if\ x\neq 1\\ z & if\ x=1\end{cases}$	4	***OR***	Find the equation of the following straight lines. a) Parallel to $x-$ axis and at a distance of 5 units below it. b) Perpendicular to $y-$ axis and passing through the point (6,4).	4
ii.	Find the area under the graph of $f(x)=x^3-x$ over the interval $[-1,1]$	4	***OR***	Determine the equation of the tangent to the curve defined by $y=2x^2-7x+1$ at $x=2$.	4
iii.	Prove that $f(x,\ y)=x^3-3xy^2+5x^2y+7y^3$ is a homogeneous equation of degree 3 and verify Euler's Theorem for f.	4	***OR***	Test the continuity of the function $f(x)=\begin{cases}1-3x, & x<-6\\ 7, & x=-6\\ x^3, & x>-6\end{cases}$ $at\ x=-6$	4
iv.	Solve the differential equation $\frac{dy}{dx}=1-xy+y-x.$	4	***OR***	Evaluate $\lim_{x\to 0}\frac{(1+x)^{-2}-1}{x}$	4
v.	Compute four iterates of the bisection method for the function $f(x)=2e^{-x}-5=0$ for [0, 1].	4	***OR***	Determine the 4th derivative of $f(z)=9sin\left(\frac{z}{3}\right)+cos(1-2z)$	4
vi.	For what value of k, line $x-y+k=0$ will touch the circle $x^2+y^2=81$. Also find tangent to the circle.	4	***OR***	Convert the equation $x^2+4y^2+2x-24y+33=0$ in standard form. Find the coordinates of the center, vertices, co-vertices and foci.	4
vii.	(a) By differentiating $x^2-y^2=1$ implicitly, show that $\frac{dy}{dx}=\frac{x}{y}$ (b) Show that $\left(\frac{dy}{du}\right)_{u=0}=0$, if $y=3sin2x$ and $x=u^2+\pi$	4	***OR***	A person on a hang glider is spiraling upward due to rapidly rising air on a path having position vector $\vec{r}(t)=(3cost)\underline{i}+(3sint)\underline{j}+(t^2)\underline{k}$. Find velocity and acceleration vectors.	4
viii.	Find values of $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ for the function $f(x,y)=\sqrt{y^2-\ln(9y+3x^2)}$	4	***OR***	Find the derivative of $\sin^{-1}\left(\frac{2x}{1+x^2}\right)w.r.t.\tan^{-1}x.$	4

ix.	Evaluate $\int \frac{dx}{x^2-1}$	4	***OR***	If $\vec{F}(t) = e^t \tan(t)\underline{i} - \sqrt{\pi}\sec(t)\underline{j} + 2t\underline{k}$, then (a) Evaluate $\vec{F}(0)$, $\vec{F}\left(\frac{\pi}{2}\right)$ and $\vec{F}\left(\frac{2\pi}{3}\right)$ (b) State domain of the function $\vec{F}$.	4
x.	Find partial derivatives f_x *and* f_y of the function $f(x,y) = x^2 e^{xy} + ln(x+y)$	4	***OR***	Find all the points on curve $y = 2x^3 + 4x^2$ where tangent line is parallel to the line $y = 8x - 4$.	4
xi.	Find whether $f(x) = (x^4 - 4x + 2)^5$ shows relative maximum, relative minimum or neither at critical value $x = 1$.	4	***OR***	Evaluate $\int xe^{-x}dx$	4
xii.	Use the Newton-Raphson iterative method to approximate the actual root $r = 0.438447$ of the non-linear equation $f(x) = x^2 - 5x + 2$ with initial start $x_o = 0.4$ that must be accurate to six decimal places.	4	***OR***	Anwar is driving a car with uniform speed $x + xt$, find: (i) Distance as a function of 't' (ii) Constant when $x(0) = 2$	4

SECTION – C (Marks 32)

$(4 \times 8 = 32)$

Note: Attempt all questions. Marks of each question are given.

Q. No.	Question	Marks		Question	Marks
Q3	A curve has an equation $y = \frac{1}{2}x^3 - 9x^{1.5} + \frac{8}{x} + 30,\ x > 0$ (a) Find $\frac{dy}{dx}$ (b) Show that a point $(4,-8)$ lies on the curve defined. (c) Find equations of the tangent and normal at $(4,-8)$ giving your answer in the form $ax + by + c = 0 \quad \forall a,b,c \in R$	8	***OR***	If $\vec{F}(t) = \underline{i} + 2e^{2t}\underline{j} + t^3\underline{k}$ and $\vec{G}(t) = 3t^2\underline{i} + 5e^{-t}\underline{j} - t3\underline{k}$ are the vector functions then evaluate a) $\frac{d}{dt}(\vec{F} \times \vec{G})(t)$ b) $\frac{d\vec{F}}{dt} \times \vec{G}$ c) $\vec{F} \times \frac{d\vec{G}}{dt}$ and verify d) $\frac{d}{dt}(\vec{F} \times \vec{G})(t) = \frac{d\vec{F}}{dt} \times \vec{G} + \vec{F} \times \frac{d\vec{G}}{dt}$	8
Q4	(a) $A(5,1)$, $B(3,-5)$ and $C(-3,7)$ are the vertices of triangle ABC. Find equations of medians of triangle ABC. (b) Show that medians of triangle ABC are concurrent.	8	***OR***	(a) If $A(-2,5), B(1,5)$ are end points of chord AB of circle $x^2 + y^2 + x - 5y - 2 = 0$, then show that line drawn from the center of circle is perpendicular to chord AB, and bisects chord AB. (b) Coordinates of end points of two chords are $P(0,2), Q(-2,0)$ and $R(0,-2), S(2,0)$. Show that the two chords PQ and RS are equidistant from the center of circle $x^2 + y^2 = 4$.	8
Q5	Evaluate $\int(\theta^4 + \pi)e^{3\theta}d\theta$	8	***OR***	Solve the differential equation $y^2dx + (xy + x^2)dy = 0$	8

Q6	If $u = \sec^{-1}\left[\frac{x-y}{x^{\frac{3}{4}}+y^{\frac{3}{4}}}\right]^{\frac{1}{7}}$, then Show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{1}{28}\cot u$	8	***OR***	Approximate the definite integral $I = \int_0^1 \sqrt{1-x^2}\,dx$ for $n = 4$ subintervals by using Simpson's Rule and then compare your approximate answer with the actual value of the definite integral.	8

Federal Board HSSC-II Examination

Mathematics Model Question Paper

(Curriculum 2006)

Alignment of Questions with Student Learning Outcomes

OBJECTIVE PART
SECTION A

Q. No. (Part no.)	Content Area/ Domain	Student Learning Outcomes	Cognitive Level *	Allocated Marks
Q1(i)	Domain: Algebra	**[11.1]: (iii)** Find partial derivatives of a function of two variable.	**K**	1
Q1(ii)	Domain: Algebra	**[2.1]: (ii)** Draw the graph of modulus function ($y = \|x\|$) and identify its domain and range.	**U**	1
Q1(iii)	Domain: Algebra	**[2.7]: (ii)** Evaluate limits of different algebraic, exponential and trigonometric functions.	**U**	1
Q1(iv)	Domain: Algebra	**[3.6]: (ii)** Find the derivative of $ln\ x$ and $\log_a x$ from first principles.	**U**	1
Q1(v)	Domain: Algebra	**[3.5]:** Inverse trigonometric functions ($arcsin\ x$, $arccos\ x$, $arctan\ x$, $arccscx$, $arcsecx$ and $arccotx$) using differentiation formulae.	**K**	1
Q1(vi)	Domain: Algebra	**[4.1]: (i)** Find higher order derivatives of algebraic, trigonometric, exponential and logarithmic functions.	**U**	1
Q1(vii)	Domain: Algebra	**[5.2]: (i)** The limit of the sum (difference) of two vector functions is the sum (difference) of their limits. The limit of the product of a scalar function and a vector function is the product of their limits	**K**	1
Q1(viii)	Domain: Geometry	**[5.4]: (ii)** Apply vector differentiation to calculate velocity and acceleration of a position vector $\vec{r}(t) = x(t)\underline{i} + y(t)\underline{j} + z(t)\underline{k}$.	**A**	1
Q1(ix)	Domain: Algebra	**[6.6]: (iii)** Extend techniques of integration using properties to evaluate definite integrals.	**U**	1
Q1(x)	Domain: Algebra	**[6.6]: (v)** Apply definite integrals to calculate area under the curve.	**A**	1
Q1(xi)	Domain: Geometry	**[7.1]: (i)** Recall distance formula to calculate distance between two points given in Cartesian plane.	**K**	1
Q1(xii)	Domain: Geometry	**[7.7]: (i)** Find the condition of concurrency of three straight lines.	**U**	1
Q1(xiii)	Domain: Geometry	**[8.2]: (i)** Define circle and derive its equation in standard form i.e. $(x-h)^2 + (y-k)^2 = r^2$	**U**	1
Q1(xiv)	Domain: Geometry	**[8.3]: (v)** Find the length of tangent to a circle from a given external point.	**K**	1
Q1(xv)	Domain: Geometry	**[9.1]: (iv)** Find the equation of a parabola with the following given elements: • focus and vertex,	**U**	1

Q1(xvi)	Domain: Geometry	**[9.3]: (iv)** Convert a given equation to the standard form of equation of a hyperbola, find its elements and sketch the graph.	**U**	1
Q1(xvii)	Domain: Algebra	**[10.1]:** Define ordinary differential equation (DE), order of a DE, degree of a DE, solution of a DE.	**K**	1
Q1(xviii)	Domain: Algebra	**[10.3]: (i)** Solve differential equations of first order and first degree of the form:	**U**	1
Q1(xix)	Domain: Algebra	**[12.1]: (iii)** Calculate real roots of a non-linear equation in one variable by: • Bisection method • Regula-Falsi method • Newton-Raphson method	**U**	1
Q1(xx)	Domain: Algebra	**[12.2]: (i)** Define numerical quadrature. Use. • Trapezoidal rule • Simpson's rule To complete the approximate value of definite integrals without error terms.	**A**	1

SUBJECTIVE PART
SECTION B & C

Q. No. (Part no.)	Content Area/ Domain	Description of Student Learning Outcomes	Cognitive Level *	OR	Content Area/ Domain	Description of Student Learning Outcomes	Cognitive Level *	Allocated Marks
Q2(i)	Domain: Algebra	**[1.3]: (i)** Plot a two-dimensional graph.	**U**	***OR***	**Domain: Geometry**	**[7.3]:** Find the equation of a straight line parallel to • $y-axis$ and at a distance $\boldsymbol{a}$ from it, • $x-axis$ and at a distance $\boldsymbol{b}$ from it.	**U**	**4**
Q2(ii)	Domain: Algebra	**[6.6]: (v)** Apply definite integrals to calculate area under the curve.	**A**	***OR***	**Domain: Geometry**	**[9.1]: (vii)** Find the equation of a tangent and a normal to a parabola at a point	**U**	**4**
Q2(iii)	Domain: Algebra	**[11.2]: (iii)** Verify Euler's theorem for homogeneous functions of different degrees (simple cases).	**U**	***OR***	**Domain: Algebra**	**[2.8]: (iii)**Test continuity and discontinuity of a function at a point and in an interval.	**U**	**4**
Q2(iv)	Domain: Algebra	**[10.3]**: **(i)** Solve differential equations of first order and first degree of the form: • separable variables	**K**	***OR***	**Domain: Algebra**	**[2.7]: (i)** Evaluate the limits of functions of the following type $\frac{(1+x)^n-1}{x}$ when $x \to 0$	**U**	**4**

Q2(v)	Domain: Algebra	**[12.1]**: **(iii)** Calculate real roots of a non-linear equation in one variable by • bisection method	**A**	***OR***	**Domain : Algebra**	**[4.1]**: **(i)** Find higher order derivatives of algebraic, trigonometric, exponential and logarithmic functions.	**K**	**4**
Q2(vi)	Domain: Geometry	**[8.3]**: **(ii)** Find the condition when a line touches the circle.	**U**	***OR***	**Domain : Geometry**	**[9.2]**: **(v)** Convert a given equation to the standard form of equation of an ellipse, find its elements and draw the graph.	**K**	**4**
Q2(vii)	Domain: Algebra	**[3.4]: (iv)** Find derivative of implicit function. Prove that $\frac{dy}{dx} = \frac{dy}{du}.\frac{du}{dx}$ when $y = f\ (u)$ and $u = g(x)$.	**U**	***OR***	**Domain : Geometry**	**[5.4]: (ii)** Apply vector differentiation to calculate velocity and acceleration of a position vector $\vec{r}(t) = x(t)\underline{i} + y(t)\underline{j} + z(t)\underline{k}$	**A**	**4**
Q2(viii)	Domain: Algebra	**[11.1]**: **(iii)** Find partial derivatives of a function of two variables.	**K**	***OR***	**Domain : Algebra**	**[3.4]: (i)** Prove that $\frac{dy}{dx} = \frac{dy}{du}.\frac{du}{dx}$ when $y = f\ (u)$ and $u = g(x)$	**U**	**4**
Q2(ix)	Domain: Algebra	**[6.5]:** Use partial fractions to find $\int \frac{f(x)}{g(x)} dx$, where $f(x)$ and $g(x)$ are algebraic functions such that $g(x)\ \neq 0$.	**U**	***OR***	**Domain : Geometry**	**[5.1]:** (i) Define scalar and vector function. ii) Explain domain and range of a vector function.	**U**	**4**
Q2(x)	Domain: Algebra	**[11.1]: (iii)** Find partial derivatives of a function of two variables.	**K**	***OR***	**Domain : Geometry**	**[8.3]**: **(ii)** Find the condition when a line touches the circle.	**K**	**4**
Q2(xi)	Domain: Algebra	**[4.4]: (iii)** Examine a given function for extreme values.	**U**	***OR***	**Domain : Algebra**	**[6.4]: (iii)** Evaluate integrals using integration by parts.	**U**	**4**
Q2(xii)	Domain: Algebra	**[12.1]: (iii)** Calculate real roots of a non-linear equation in one variable by Newton-Raphson method.	**U**	***OR***	**Domain : Algebra**	**[10.3] (ii)** Solve real life problems related to differential equations.	**A**	**4**

Q3	**Domain: Geometry**	**[4.3]: (ii)** Find the equation of tangent and normal to the curve at a given point.	**K**	***OR***	**Domain: Geometry**	**[5.4]: (ii)** Apply vector differentiation to calculate velocity and acceleration of a position vector $\vec{r}(t) = x(t)\underline{i} + y(t)\underline{j} + z(t)\underline{k}$.	**A**	**8**
Q4	**Domain: Geometry**	**[7.7]**: **(ii)** Find the equation of median, altitude and right bisector of a triangle.	**U**	***OR***	**Domain: Geometry**	**[8.4]**: Prove analytically the following properties of a circle. Perpendicular from the center of a circle on a chord bisects the chord.	**A**	**8**
Q5	**Domain: Algebra**	**[6.4]: (iii)** Evaluate integrals using integration by parts.	**U**	***OR***	**Domain: Algebra**	**[10.3]**: **(i)** Solve differential equations of first order and first degree of the form: • homogeneous equations	**K**	**8**
Q6	**Domain: Algebra**	**[11.2]: (iii)** Verify Euler's theorem for homogeneous functions of different degrees (simple cases).	**U**	***OR***	**Domain: Algebra**	**[12.2]: (i)** Define numerical quadrature. Use Simpson's rule, to compute the approximate value of definite integrals without error terms.	**K**	**8**

*Cognitive Level

K: Knowledge
U: Understanding
A: Application

Table of Specification

Model Question Paper Mathematics – Grade XII (HSSC-II)

(Curriculum 2006)

Topics	1 INTRODUCTION TO SYMBOLIC PACKAGE: MAPLE	2 FUNCTIONS AND LIMITS	3 DIFFERENTIATION	4 HIGHER ORDER DERIVATIVES AND APPLICATIONS	5 DIFFERENTIATION OF VECTOR FUNCTIONS	6 INTEGRATION	7 PLANE ANALYTIC GEOMETRY – STRAIGHT LINE	8 CONICS – I	9 CONICS – II	10 DIFFERENTIAL EQUATIONS	11 PARTIAL DIFFERENTIATION	12 INTRODUCTION TO NUMERICAL METHODS	Total marks of each assessment objectives	Percentage of Cognitive Level
Knowledge			1v(1)	2v/s(4) 3/f(8)	1vii(1)		1xi(1)	1xiv(1) 2x/s(4)	2vi/s(4)	1xvii(1) 2iv/f(4) 5/s(8)	1i(1) 2viii/f(4) 2x/f(4)	6/s(8)	54	30%
Comprehension		1ii(1) 1iii(1) 2i/f(4) 2iii/s(4) 2iv/s(4)	1iv(1) 2vii/f(4) 2viii/s(4)	1vi(1) 2xi/f(4)	2ix/s(4)	1ix(1) 2ixf/(4) 2xi/s(4) 5/f(8)	1xii(1) 2i/s(4) 4/f(8)	1xiii(1) 2vi/f(4)	1xv(1) 2ii/s(4)	1xviii(1)	2iii/f(4) 6/f(8)	1xix(1) 2xii/f(4)	90	50%
Application					1viii(1) 2vii/s(4) 3/s(8)	1x(1) 2ii/f(4)		4/s(8)	1xvi(1)	2xii/s(4)		1xx(1) 2v/f(4)	36	20%
Total marks		14	14	17	18	22	14	18	10	18	21	18	180	100%

Key:

- 1, 2, 3 etc. stands1 for question numbers
- i, ii, iii etc. stands for part of question numbers
- (1), (2), (3) etc. stands for marks of question papers
- Question Number (part/ first choice) marks example: Q2 (i / f) 4
- Question Number (part/ second choice) marks example: Q2 (i / s) 4

Note:

1 This TOS does not reflect policy, but it is particular to this model question paper.

2 Proportionate / equitable representation of the content areas may be ensured.

3 The percentage of cognitive level is 20%, 50%, and 30% for knowledge, understanding, and application, respectively with **± 5%** variation.

4 While selecting alternative questions for SRQs and ERQs, it must be kept in mind that:

- Difficulty levels of both questions should also be same
- SLOs of both the alternative questions must be different