BALOCHISTAN BOARD OF INTERMEDIATE & SECONDARY EDUCATION, QUETTA

TIME: 3 HOURS INTERMEDIATE (ANNUAL) EXAMINATION, 2018 MARKS: - 100

Group-II SUBJECT:- MATHEMATICS - B PASS MARKS: 33

NOTE. Section A is comulsory. Attempt any ten parts from Section B and any five from Section C.

* MATH

SECTION – A

Q.1(a). Choose the correct option i.e a / b / c / d. Each part carries one mark. 20 × 1 = 20

(i). The Range of function $f(x) = \frac{2}{x^2+2}$ is ------ (a) R (b) $R - \{0\}$ (c) $[-2,2]$ (d) $[-1,1]$

(ii). If $f(x) = \frac{3}{2+x^2}$, then $f(-1)$ is (a) 1 (b) $\frac{3}{2}$ (c) $\frac{3}{4}$ (d) 3

(iii). The function $f(x) = K$ where K is constant is called --------- (a) *Cubic function* (b) *Linear function* (c) *Constant function* (d) *Logarithmic function*

(iv). The derivative of $Cosecx$ is ------ (a) tan^{2x} (b) $-Cosec^{2x}$ (c) $Secx\ tanx$ (d) $-cosecx\ cotx$

(v). $\lim_{x\to 1} \frac{\sqrt{x^2+8}}{2}$ is --------- (a) $\frac{\sqrt{3}}{2}$ (b) $\frac{3}{2}$ (c) $\frac{9}{2}$ (d) 2

(vi). If $y = tanx$, then y_2 is ------- (a) Sec^2x (b) $Secx\ tanx$ (c) $2Sec^2x\ tanx$ (d) $-Cot^2x$

(vii). $\int Sec^2x dx =$ ------ (a) $tanx + c$ (b) $2Sec^2x\ tanx + c$ (c) $\frac{Sec^3x}{3} + c$ (d) $Secx\ tanx + c$

(viii). $\int \frac{1}{\sqrt{a^2-x^2}} dx =$ ----- (a) $\frac{1}{a} Sin^{-1}\left(\frac{x^2}{a}\right)$ (b) $Sin^{-1}\left(\frac{x}{a}\right) + c$ (c) $Cos^{-1}\left(\frac{x}{a}\right)$ (d) $tan^{-1}\left(\frac{x}{a}\right)$

(ix). The solution of differential equation $\frac{dy}{dx} = \frac{1}{\sqrt{x^2-1}}$ is ------ (a) $cos h^{-1}\left(\frac{x}{y}\right) + c = 1$ (b) $y = cos h^{-1}x + c$ (c) $y = cot h^{-1}x + c$ (d) $y = cos h^{-1}x + c$

(x). The distance of point (x_1, y_1) from the origin is ------- (a) $x_1^2 + y_1^2$ (b) $\sqrt{x_1^2 + y_1^2}$ (c) $x_1 + x_2$ (d) $(x_1 - y_1)^2$

(xi). The line l is parallel to x –axis, then slope will be (a) zero (b) -1 (c) 1 (d) undefined

(xii). The perpendicullar distance of the line $3x + 4y + 10 = 0$ from origin is ---- (a) 2 (b) 0 (c) 3 (d) 1

(xiii). $x = 0$ is not in the solution of the inequality (a) $2x + 3 < 0$ (b) $2x + 3 > 0$ (c) $x + 4 > 0$ (d) $x + 5 > 0$

(xiv). $(x-1)^2 + (y-2)^2 = 4$ is equation of circle with centre at ------ (a) (1,2) (b) (−1,−2) (c) (−1,2) (d) (2,1)

(xv). Point (x_1, y_1) lies outside the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ if (a) $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c > 0$ (b) $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c < 0$ (c) $x_1^2 + y_1^2 = 0$ (d) $x_1^2 + y_1^2 + 2fy_1 = 0$

(xvi). The equation of the focal chord of the Parabola $x^2 = 3y$ is ---- (a) $y = \frac{3}{4}$ (b) $x = \frac{3}{4}$ (c) $x + \frac{4}{7} = 0$ (d) $y + \frac{4}{7} = 0$

(xvii). The centre of the ellipse $\frac{(x+5)^2}{a^2} + \frac{(y+3)^2}{b^2} = 1$ is ------ (a) (−5,−3) (b) (5,3) (c) (a,b) (d) (x,y)

(xviii). For the standard ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$ length of Major axis is ---- (a) $2b$ (b) $2a$ (c) a (d) b

(xix). The vector quantity in the following is ------- (a) *Angular velocity* (b) *Distance* (c) *Speed* (d) *Energy*

(xx). For α, β, γ are the direction angles of a vector $\underline{r}$, then $cos^2\alpha + cos^2\beta + cos^2\gamma =$ --- (a) 1 (b) 0 (c) 2 (d) 3

SECTION – B

Q.2. Attempt any ten (10) parts. All parts carry equal marks. 10 × 4 = 40

(a). Find domain and range of $f(x) = cotx$

(b). If $f(x) = \sqrt{x+1}$, $g(x) = cosx$, find $(f+g)x$

(c). Evaluate $\lim_{y\to 3} \frac{y-\sqrt{3}}{y-3}$

(d). Find $\frac{dy}{dx}$ if $y = \frac{\sqrt{x^2+1}}{2x+1}$

(e). If $y = \sqrt{cotx + \sqrt{cotx + \sqrt{cotx + \sqrt{cotx + \ldots\infty}}}}$ then show that $(2y-1)\frac{dy}{dt} + cosec^2x = 0$

(f). Integrate $\int \frac{e^{tan^{-1}x}}{1+x^2} dx$

(g). Solve the differential equation $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$

(h). Find the value of a if $(2, a)$ is equidistant from the points (4,3) and (6,4).

(i). Reduce equation $5x - 3y + 15 = 0$ to slope-intercept form.

(j). Find an equation of circle with centre at (0,0) and radius 3.

(k). Find magnitude and direction of the vector $\underline{b} = 3\hat{i} + \hat{j} + \hat{k}$

(l). Find an equation of straight line through (2,4) and (6,5).

(m). What are Coplaner Vectors ?

(n). What are the Parametric equation of circle with centre at (0, 0) and radius r.

SECTION – C

Attempt any five (5) question. All questions carry equal marks. 5 × 8 = 40

Q.3. Evaluate $\lim_{x\to 0} \frac{a^x - 1}{x}$

Q.4. By using first Principle method, Find the derivative of $cot\theta$

Q.5. Integrate $\int \frac{(2x-3)}{(x^2-1)(2x+3)} dx$

Q.6. Integrate $e^{ex} cosbx$ using by parts method.

Q.7. Find an equation of *tangent* to the Parabola $y^2 = 5x$ parallel to the line through the points (2,1) and (3,-7)

Q.8. Find equations of *tangents* to the Parabola $y^2 = 16x$ through (3, −7).

Q.9. Using Vectors, Prove that $Sin(\alpha + \beta) = Sin\alpha Cos\beta + Cos\alpha Sin\beta$