

BCE-103

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING,
A.P. VIJAYAWADA

MAY-2019

BCE - BRIDGE COURSE EXAMINATION
CHEMISTRY

Time: 1h:30 min.

Max. Marks: 50

Section : A

5x4=20M

Instructions: 1) Answer any five questions
2) Each question carries **four** marks.

- 1) Define Atomic number and Mass number. Give one example.
- 2) 4g of NaOH is present in 500ml of solution. Find the Molarity of solution.
- 3) Define Buffer solution. Give two examples.
- 4) Define Electrochemical equivalent and chemical equivalent.
- 5) Define Corrosion and Rusting of Iron.
- 6) Define Soft water and hard water.
- 7) Define Plastic and polymerization.
- 8) Define Pollutant and Contaminant.

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MAY-2019

BCE - BRIDGE COURSE EXAMINATION

MATHEMATICS

Time: 3 Hours

Max.Marks:100

PART-A(40 Marks)

Instructions: 1) Answer any **Eight** questions
2) Each questions carries **Five** marks.

1) Expand $(2a+3b)(-a+2b-3c)$.

2) Simplify $5(-x+y-2z)-3(x-2y+4z)$.

3) If $f(x)=ax^2+bx+c$; find $f(1)-f(-1)$.

4) Rationalize the denominator of $\frac{(1+\sqrt{2}+\sqrt{3})}{3-\sqrt{5}}$

5) Find the sum and product of the roots of the Equation $x^2-x-5=0$.

6) If $A = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$, find $2A-B^T$.

7) If $\tan A = 3/4$, Find $\sin A$ and $\cos A$.

8) Find the coordinates of the mid points of the sides of a triangle formed by $A(-1,2)$, $B(2,-5)$, $C(1,6)$.

9) Find the slope of the line joining the points $A(-1,3)$, $B(2,-5)$

10) Evaluate $\lim_{x \rightarrow 3} \frac{(x^3 - 27)}{x - 3}$

11) Find the derivative of $x^5 + \cos(x) - e^x + \log(x)$ with respect to x .

12) Find the derivative of $x \tan x$ with respect to x .

PART-B(60Marks)

Instructions: 1) Answer any **five** questions
2) Each questions carries **12** marks.

13) (a) Resolve $\frac{7x - 6}{(x - 1)(x - 2)}$ into partial fractions.

(b) If $A = \begin{bmatrix} -1 & 2 \\ -3 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -3 \\ 1 & -1 \end{bmatrix}$, find $(BA)^T$.

14) (a) If $A = \begin{bmatrix} 0 & -3 & 1 \\ 4 & 5 & 6 \\ 3 & -1 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 & 1 \\ -2 & -1 & 3 \\ 4 & 0 & 5 \end{bmatrix}$, show that $(A+B)^T = A^T + B^T$.

15) (a) Prove that $\cos(A+45^\circ) + \sin(A-45^\circ) = 0$.

(b) If $\cot A = 1/2$, $\tan B = 1/3$, find $\tan(A+B)$ and $\cot(A-B)$.

16) (a) Show that $\cos(x)\cos(60^\circ - x)\cos(60^\circ + x) = \frac{1}{4}\cos(3x)$

(b) Prove that $\cos(40^\circ) + \cos(80^\circ) + \cos(160^\circ) = 0$

17) (a) Show that $\sin^{-1} \frac{5}{13} = \cos^{-1} \frac{12}{13}$

(b) Show that $\tan^{-1} \frac{3}{4} + \tan^{-1} \frac{5}{12} = \tan^{-1} \frac{56}{33}$

18) (a) Write the Equation $2x-3y+1=0$ in slope- intercept form.

(b) Find the Equation of the straight line passing through the point $(1,-2)$ and parallel to the line $3x-2y+1=0$.

19) (a) Find the derivative of e^x using first principle

(b) Evaluate $\lim_{x \rightarrow 0} \left(\frac{\sqrt{1+x} - \sqrt{1-x}}{x} \right)$

20) Differentiate the following with respect to x .

(a) $\frac{1+\sqrt{x}}{1-\sqrt{x}}$

(b) $e^x(x^2-1)$

BCE-102

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING,
A.P. VIJAYAWADA

MAY-2019

BCE - BRIDGE COURSE EXAMINATION
PHYSICS

Time: 1h:30min

Max.Marks:50

Section-A

5x4=20M

Instructions: 1) Answer any five questions.
2) Each question carries **four** marks.

- 1) Write the dimensional formulae of the following physical quantities.
 - (a) Universal Gravitational constant (G),
 - (b) Universal Gas constant (R),
 - (c) Momentum
 - (d) Angular momentum.
- 2) Define dot product of two vectors, give mathematical expression for work.
- 3) Derive an expression for maximum height reached by a particle projected with a velocity 'u' from the ground.
- 4) Define periodic motion, and give any three examples.
- 5) State Boyle's law, draw rough graph for the law.
- 6) Define surface tension, write the unit and dimensional formula for surface tension.
- 7) State ohm's law and derive an expression for specific resistance.
- 8) Explain Total internal reflection.

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Section-B

3x10=30M

- Instructions:** 1) Answer any **three** questions
2) Each question carries **ten** marks.

- 9) (a) Define a unit vector and position vector with suitable figures (4M)
(b) State parallelogram law of addition of vectors and derive an expression for magnitude of resultant vector of two vectors inclined at an angle θ with each other. (6M)
- 10) (a) Define three types of frictions. Write the mathematical expressions for each of them. (6M)
(b) List out four methods to reduce friction. (4M)
- 11) (a) State first and second law of thermodynamics. (4M)
(b) Explain isothermal and adiabatic process. (6M)
- 12) (a) Define Hooke's law, and define modulus of elasticity. Give its SI units and dimensional formulae. (6M)
(b) Mention any four examples for surface tension, and state the formula for surface tension based on the rise of liquid in capillary tube (4M)
- 13) (a) State and explain Coulomb's inverse square law of magnetism. (4M)
(b) Derive the expression $T = MB \sin\theta$, where ' θ ' angle between the bar magnet and magnetic induction field \vec{B} . (6M)
- 14) (a) State photo electric effect and derive Einstein photoelectric equation. (2+3M)
(b) Define critical angle and explain working of optical fibre (2+3M)
