

Visvesvaraya Technological University, Belgaum

Technical Aptitude Test (TAT) March – 2011

Ph.D./ M.S.c. (Engg)

Time: 2 Hours

Polymer Science & Technology

Max. Marks: 100

Instructions to the Candidates:

1. Write Name & Seat Number in the OMR Sheet.
2. Question paper consists of Part I, II and III. & each question carries one mark.
3. All questions are multiple-choice questions and there shall be no negative marking for wrong answers.
4. Mark the answers only on the OMR Sheet provided
5. Use **BLACK SKETCH PEN** to darken the circle for marking the answer
6. Missing data, if any, may be suitably assumed
7. Scientific Calculator is permitted. However, programmable Calculators are not allowed.
8. Return the OMR sheet to the Room Invigilator, before leaving the examination hall.

PART-I
(Mathematics Section)

30 Marks

1. Matrix has a value. This statement
(a) is false (b) is always true (c) depends upon the matrices (d) None of these

2. If 1 is the minimum eigen value of the matrix

$$A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$$

- (a) 5 (b) 4 (c) 2 (d) 6

- 3 The rank of matrix

$$\begin{bmatrix} 3 & 4 & 5 & 6 & 7 \\ 4 & 5 & 6 & 7 & 8 \\ 5 & 6 & 7 & 8 & 9 \\ 10 & 11 & 12 & 13 & 14 \end{bmatrix}$$

- (a) 0 (b) 2 (c) 3 (d) 4

4. The inverse of the matrix

$$\begin{bmatrix} -0.5 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

- (a) $\begin{bmatrix} -0.5 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 0.5 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (c) $\begin{bmatrix} -2 & 0 & 0 \\ 0 & 0.25 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & 0 & 0 \\ 0 & -0.25 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

5. The value of λ for which the following equations, $2x + 3y + 5z = 9$, $7x + 3y - 2z = 8$, $2x + 3y + \lambda z = 9$ have an infinite solution is

- (a) 2 (b) 3 (c) 5 (d) 1

6. $\frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}}$ is a homogeneous function of degree is

- (a) 1/2 (b) -1/2 (c) 0 (d) 1

7. The angle between the radius vector and tangent for the curve $r = ae^{\cot \alpha}$ is

- (a) α (b) $-\Pi/2$ (c) $-\alpha$ (d) $\Pi/2$

8. The curve $y^2(x-a) = x^2(x+a)$ is symmetrical about ---

- (a) x-axis (b) y-axis (c) both the axes (d) None of these

9. The value of integral of $x^3 \sqrt{2ax - x^2}$ with respect to x between the limits 0 and 2a is

- (a) $38/5$ (b) $7\Pi a^5 / 8$ (c) $7\Pi a^3 / 8$ (d) $\Pi a^5 / 8$

10. $\iint dx dy$ over the closed area $x^2 + y^2 = r^2$ is

- (a) Πa^2 (b) $2\Pi a^2$ (c) $3\Pi a^2$ (d) $4\Pi a^2 / 4$

25. The value of $\int_0^1 dx/1+x^2$ by Simpson's rule (n=1/4) is
(a) 0.7854 (b) 0.7345 (c) 0.6935 (d) 0.7534

26. Co-efficient of variation is

(a) $\frac{\sigma \times 100}{\text{Mean of X}}$ (b) σ/X (c) $\frac{\text{Mean of X} \times 100}{\sigma}$ (d) $\sigma/X \times 100$

27. If $P(B) = 0.81$ and $P(A \cap B) = 0.18$ then $P(A/B)$ is equal to
(a) 0.2342 (b) 0.2222 (c) 0.3845 (d) 0.5038

28. The distribution in which mean, median and mode are equal is
(a) Symmetrical (b) normal curve (c) Non symmetrical (d) None of these

29. The minimum value correlation co-efficients is
(a) 0 (b) 1 (c) -1 (d) 2

30. Quartile deviation is defined as
(a) $\frac{1}{2}(Q_3 + Q_1)$ (b) $\frac{1}{2}(Q_3 - Q_1)$ (c) $\frac{1}{2}((Q_3 + Q_1) / (Q_3 - Q_1))$ (d) $(Q_3 - Q_2)$
