



PART – A

Directions (Q. Nos. 1-2); These questions are based on the information given below:
Seven persons a, b, c, d, e, f and g are sitting in a row (not necessarily in the same order) facing North, such that :

- i. only two persons sit between f and g and g sits second to the left of b;
- ii. d sits third to the left of c ; and
- iii. e sits exactly between g and b, and b sits at the extreme right end of the row.

1. How many persons sit between f and e ?
A) One B) Two C) Three D) Four
2. Who amongst the following sits exactly in the middle of the line ?
A) a B) c C) e D) g
3. Find the missing character (?) in the following question.

1	2	3
11	7	5
120	45	?

- A) 15 B) 16 C) 17 D) 18
4. Two statements are given in the following question, followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements, disregarding known facts. Give answer.
A) if only conclusion I follows
B) if only conclusion II follows
C) if neither I nor II follows
D) if both conclusions I and II follow

Statements

- I. Some teachers are followers.
- II. Some followers are famous.

Conclusions

- I. Some teachers are famous.
- II. Some followers are teachers.



PART – B

26. $\frac{d}{da} \log_a x$ equals

A) $\frac{1}{x}$

B) $\frac{1}{a}$

C) $-\frac{1}{a \log_e a} \log_a x$

D) $\frac{1}{x \log_e a} \log_x a$

27. The solution of the initial value problem $\frac{dy}{dx} = \frac{(1-x)}{y}, y(-1) = 1$ is defined for which range of values of x ?

A) $x < 0$

B) $|x - 1| < \sqrt{5}$

C) $x < 1 + \sqrt{5}$

D) all real x

28. Which of the following functions is a solution of the following differential equation

$$\frac{dy}{dt} = -\frac{t}{y}$$

A) $y(t) = \sqrt{4-t^2}$

B) $y(t) = -\sqrt{4+t^2}$

C) $y(t) = -t$

D) $y(t) = 1/t$

29. Given differential equation $\frac{dy}{dt} - 2y = e^{2t}$ with initial condition $y(0) = 2$. Which of the following is the correct solution to this problem ?

A) $y(t) = e^{2t} + e^{-2t}$

B) $y(t) = (t + 2)e^{2t}$

C) $y(t) = (t + 2)e^{-2t}$

D) $y(t) = 2e^{2t} - e^{-2t}$

30. For which value of λ are the functions $f_1(t) = t^2 - 1$ and $f_2(t) = t^2 + (\lambda - 1)t - \lambda$ linearly dependent ?

A) there is no such λ

B) $\lambda = -1$

C) $\lambda = 1$

D) for all λ

31. Which among the following is equal to $\int_0^1 \int_{\sqrt{y}}^1 e^{x^3} dx dy$

A) $\int_0^1 \int_0^{\sqrt{x}} e^{x^3} dx dy$

B) $\int_0^1 \int_1^{\sqrt{x}} e^{x^3} dx dy$

C) $\int_0^1 \int_0^{x^2} e^{x^3} dx dy$

D) $\int_0^1 \int_{x^2}^0 e^{x^3} dx dy$