



## MAT-CPDM

Section 1 of 3

# Manufacturing Aptitude Test (MAT)- Instructions



It is mandatory that you fill out your Name, Application No., Contact No., Aadhaar No. and Email ID.

There are two sections, both the sections are compulsory.

Section 1, Mathematics knowledge has FOUR questions. Answer any TWO from these.

Section 2, Technical knowledge has NINE (In the ACTUAL test there will be FOURTEEN) questions. Answer any EIGHT from these.

Carefully follow the Instructions for writing each answer.

Make sure that you click the submit button before the form closes automatically at the end of the time limit.

Full Name \*

Short answer text

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Application No. \*

Short answer text

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Contact No. (Mobile) \*

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Short answer text

Aadhaar No. \*

Short answer text

Email ID \*

Short answer text

After section 1 Continue to next section



Section 2 of 3

## Mathematics knowledge



Mathematics knowledge has FOUR questions. Answer any TWO from these.

1) The angle (in degrees) between two vectors  $a = (\sqrt{3}/2) i + (1/2)j$  and  $b = -(\sqrt{3}/2) i + (1/2)j$  is:

- 30
- 60
- 90
- 120

problem. If a candidate gets 2200 marks after 100 problems. How many problems were solved

- 30
- 35
- 45
- 65

3) If  $n(A) = 20$  and  $n(B) = 30$  and  $n(A \cup B) = 40$  then  $n(A \cap B)$  is?

Short answer text

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4) Find the value of  $\lambda$  such that the vectors  $(\lambda, 2, -1)$  and  $(1, 1, -3\lambda)$  are perpendicular

Short answer text

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After section 2 Continue to next section



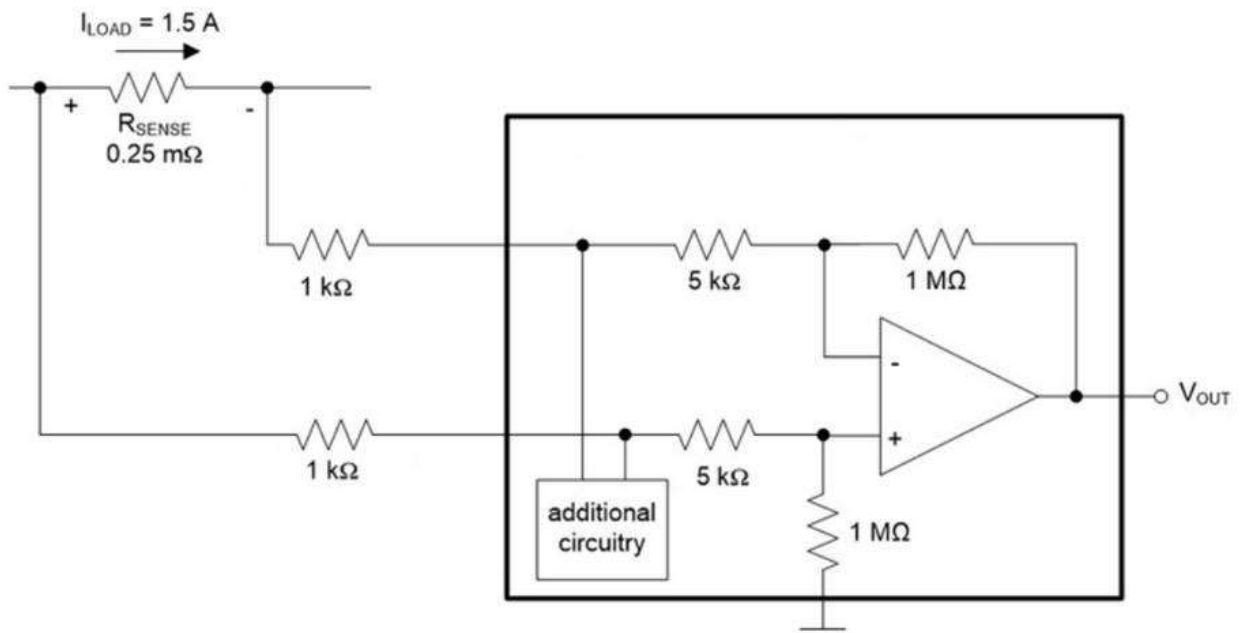
Section 3 of 3

## Technical knowledge



Technical knowledge has FOURTEEN questions. Answer any EIGHT from these.

1). Consider the circuit shown below. Let the op-amp is ideal, compute the output voltage.



Short answer text

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2) An industrial control system closed-loop transfer function is given by  $100 / (S^2 + 100Ks + 100)$

- $K > 0.55$
- $K < 0.12$
- $K < 0.38$
- $K > 0.20$

3) While driving along the highway at  $40 \text{ m/s}$ , you spot a police car  $50 \text{ m}$  ahead, traveling at a constant speed of  $30 \text{ m/s}$  which is the speed limit. You apply the brakes and begin decelerating. Assume that the police officer will give you a speeding ticket only if you pass her car. At what deceleration speed, at what time and at what distance, you may be at the same distance with the police car and may get a speeding ticket?

2 m/s<sup>2</sup>, 7 sec, 210m

2.5m/s<sup>2</sup>, 5 sec, 150m

3 m/s<sup>2</sup>, 3 sec, 90m

None of the above

4) Write the Taylor's equation of tool life (T) as a function of cutting speed (V) and other parameters. If the Taylor's tool life exponent is 0.5 and the machining constant is 120, calculate the percentage change in tool life when the cutting speed is reduced by 50%.

100%

200%

300%

400%

5) The exit valve of a 10,000L tank is left open by mistake. Height of the base of the tank 5m and cross-sectional area of exit tube is 1cm<sup>2</sup>. Assuming tank has very large base and no frictional losses calculate time taken for the tank to drain out. (use  $g = 10\text{m/sec}^2$ )

10 sec

16min and 40sec

2 hr 46min and 40sec

Tank will take infinitely long time to empty

6) Which of the following has the highest yield strength?

Brass

Iron

Nickel

7) Briefly explain what is annealing?

Long answer text

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8) What is Turing

Long answer text

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9) What is 18 as a binary number?

Short answer text

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