APGENCO/APTRANSCO AE/Electrical Sample Question

1	For the scalar field u = $\dfrac{x^2}{2} + \dfrac{y^2}{3}$, magnitude of the gradient at the point (1,3) is
Options	**A)** $\sqrt{13/9}$ **B)** $\sqrt{9/2}$ **C)** $\sqrt{5}$ **D)** $\dfrac{9}{2}$
Correct Answer	C

2	A digital-to-analog converter with a full-scale output voltage of 3.5 V has a resolution close to 14m V. Its bit size is
Options	**A)** 4 **B)** 8 **C)** 16 **D)** 32
Correct Answer	B

3	A single-phase half-controlled rectifier is driving a separately excited dc motor. The dc motor has a back emf constant of 0.5 V/rpm. The armature current is 5 A without any ripple. The armature resistance is 2Ω. The converter is working from a 280 V, single phase ac source with a firing angle of 80°. Under this operating condition, the speed of the motor will be
Options	**A)** 339 rpm **B)** 359 rpm **C)** 366 rpm **D)** 386 rpm
Correct	C

Answer

4	In relation to the synchronous machines, which one of the following statements is false?
Options	**A)** In salient pole machines, the direct-axis synchronous reactance is greater than the quadrature-axis synchronous reactance **B)** The damper bars help the synchronous motor self start

A) In salient pole machines, the direct-axis synchronous reactance is greater than the quadrature-axis synchronous reactance

B) The damper bars help the synchronous motor self start

C) Short circuit ratio is the ratio of the field current required to produce the rated voltage on open circuit to the rated armature current

D) The V-curve of a synchronous motor represents the variation in the armature current with field excitation, at a given output power

Correct Answer   C

5   The 8085 assembly language instruction that stores the content of H and L registers into the memory locations 2050_H and 2051_H, respectively, is

Options

A) SPHL 2050_H **B)** SPHL2051_H

C) SHLD 2050_H **D)** STAX 2050_H

Correct Answer   C

6   If $\overline{E}$ is the electric field intensity, $\nabla(\nabla \times \overline{E})$ is equal to

Options

A) $\overline{E}$ **B)** $|\overline{E}|$

C) null vector   **D)** zero

Correct   D

Answer

7   For the function $f(x) = x^2 e^{-x}$, the maximum occurs when x is equal to

Options
   A) 2 **B)** 1
   C) 0 **D)** -1

Correct
Answer   B

8   Two wattmeters, which are connected to measure the total power on a three -
phase system supplying a balanced load, read 10.5 kW and - 2.5 kW,
respectively. The total powere and the power factor, respectively, are

Options
   A) 13.0 kW, 0.334   **B)** 13.0 kW, 0.684

   C) 8.0 kW, 0.52   **D)** 8.0 kW, 0.334

Correct
Answer   D

9   The insulation strength of an EHV transmission line is mainly governed by

Options
   A) load power factor   **B)** switching over-voltages

   C) harmonics   **D)** corona

Correct
Answer   B

10   For the equation,
$s^3 - 4s^2 + s + 6 = 0$
the number of roots in the left half of s-plane will be

Options
   A) zero   **B)** one

   C) two   **D)** three

Correct
Answer   C

11   A dc potentiometer is designed to measure up to about 2 V with a slide wire of

800 mm. A standard cell of emf 1.18 V obtains balance at 600 mm. A test cell is seen to obtain balance at 680 mm. The emf of the test cell is

Options

A) 1.00V   **B)** 1.34V

C) 1.50V   **D)** 1.70V

Correct Answer   B

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12   High Voltage DC (HVDC) transmission is mainly used for

Options

A) bulk power transmission over very long distances

B) inter-connecting two systems with the same nominal frequency

C) eliminating reactive power requirement in the operation

D) minimizing harmonics at the converter stations

Correct Answer   A

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13   A bipolar junction transistor (BJT) is used as a power control switch by biasing it in the cut-off region (OFF state) or in the saturation region (ON state). In the ON state, for the BJT

Options

A) both the base-emitter and base-collector junctions are reverse biased

B) the base-emitter junction is reverse biased, and the base-collector junction is forward biased

C)

the base-emitter junction is forward biased, and the base-collector junction is reverse biased

D) both the base-emitter and base-collector junctions are forward biased

Correct Answer   D

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14   The Q - meter works on the principle of

Options   **A)** mutual inductance   **B)** self inductance

C) series resonance   **D)** parallel resonance

Correct Answer   C

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15   A 800 kV transmission line is having per phase line inductance of 1.1 mH/km and per phase line capacitance of 11.68 nF/km. Ignoring the length of the line, its ideal power transfer capability in MW is

Options
A) 1204 MW **B)** 1504 MW
C) 2085 MW **D)** 2606 MW

Correct Answer   C

If the following program is executed in a icroprocessor, the number of instruction cycles it will take from START to HALT is

16

```
START MVI A, 14H ; Move 14H to register A
SHIFT  RLC        ; Rotate left without carry
       JNZ SHIFT ; Jump on non-zero to SHIFT
       HALT
```

Options
A) 4   **B)** 8
C) 13 **D)** 16

Correct Answer   C

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17   A moving iron ammeter produces a full scale torque of 240 μNm with a deflection of 120° at a current of 10 A. The rate of change of self inductance (μH/radian) of the instrument at full scale is

Options
A) 2.0 μH/radian   **B)** 4.8 μH/radian
C) 12.0 μH/radian   **D)** 114.6 μH/radian

Correct Answer   B

18	At an industrial sub-station with a 4 MW load, a capacitor of 2 MVAR is installed to maintain the load power factor at 0.97 lagging. If the capacitor goes out of serivce, the load power factor becomes

Options	**A)** 0.85 **B)** 1.00 **C)** 0.80 lag **D)** 0.90 lag

Correct Answer	C

19	The conduction loss versus device current characteristic of a power MOSFET is best approximated by

Options	**A)** a parabola **B)** a straight line **C)** a rectangular hyperbola **D)** an exponentially decaying function

Correct Answer	A

20	If P and Q are two random events, then the following is TRUE

Options	**A)** Independence of P and Q implies that probability $(P \cap Q) = 0$ **B)** Probability $(P \cup Q) \geq$ Probability (P) + Probability (Q) **C)** If P and Q are mutually exclusive, then they must be independent **D)** Probability $(P \cap Q) \leq$ Probability (P)

Correct Answer	D