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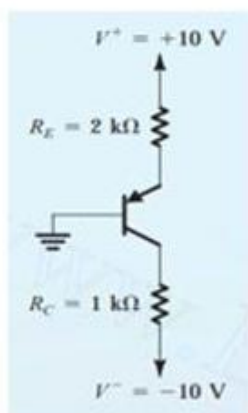### (S & T) 20 Jan 2020

Uttar Pradesh Metro Rail Corporation Limited
उत्तर प्रदेश मेट्रो रेल कॉर्पोरेशन लिमिटेड
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UP Metro Rail Corporation

Participants Id	
Participant Name	
Test Center Name	
Test Date	20/01/2020
Test Time	4:00 PM - 6:00 PM
Subject	NE 03 Jr Engineer (S&T)

Section : **Technical**

Q.1

In the given figure, find I_B ($\beta = 100$).

Ans
- ✗ A. 0.5 mA
- ✗ B. 0.02 μA
- ✔ C. 0.05 mA
- ✗ D. 0.14 μA

Question ID : **95506719**
Chosen Option : **3**

Q.2 Which of the following options is NOT an example of servomechanism?

Ans
- ✔ A. Manual speed control
- ✗ B. Machine tool position control
- ✗ C. Automobile power steering
- ✗ D. Missile launchers

Question ID : **95506726**
Chosen Option : **4**

Q.3 The loop T states are:

LXI B, 2384H

LOOP : DCX B

MOV A, C

ORA B

JNZ LOOP

Ans ✔ A. 24

✘ B. 92

✘ C. 35

✘ D. 98

Q.4 When a rubber test sample is subjected to an increase in ambient temperature:

Ans ✔ A. volumetric resistance decreases

✘ B. there is no change in volumetric resistance

✘ C. volumetric resistance increases

✘ D. there is decrease in conductivity

Q.5 Which of the following statements is true?

Ans ✘ A. Dead zone in a graph signifies linearity.

✔ B.
If a differential equation describing the system has constant coefficients, then the system is linear.
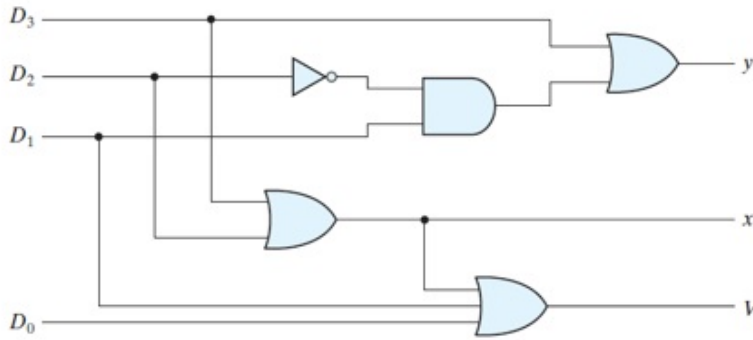
✘ C. Most of the physical systems are non-linear systems.

✘ D.
A linear system does not satisfy the superposition property.

Q.6

The logic shown in the given figure works as:

Ans   ✗ A. binary to gray converter

     ✗ B. binary to XS-3 converter

     ✔ C. priority encoder

     ✗ D. decoder

Question ID : **95506752**
Chosen Option : **3**

Q.7   Electric field is zero:

Ans   ✔ A. within a conductor

     ✗ B. at the edges of a conductor

     ✗ C. at the surface of a conductor

     ✗ D. within an insulator

Question ID : **9550679**
Chosen Option : **3**

Q.8   The efficiency of a lead acid cell does NOT depend on the:

Ans   ✗ A. rate of charge and discharge

     ✗ B. temperature

     ✔ C. pressure

     ✗ D. internal resistance

Question ID : **9550676**
Chosen Option : **3**

Q.9 Shape of a Lissajous figure depends on the:

Ans ✗ A. amplitude of the two waves only

✔ B. amplitude, phase and frequency of the two waves

✗ C. area of the deflection plates
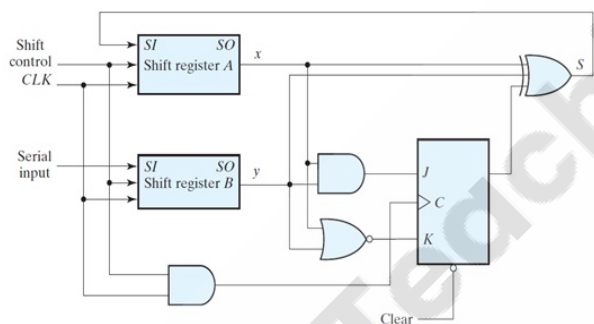
✗ D. length of the deflection plates

Q.10 Which of the following assumptions is true for armature controlled DC motor?

Ans ✗ A. Field is given variable excitation.

✗ B. Coefficient of friction varies with speed.

✔ C. Back emf is proportional to speed.

✗ D.

Torque developed is inversely proportional to armature current.
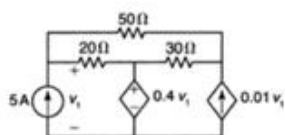
Q.11

In the given figure, what will be the binary value in register A after two shifts for the serial adder which uses two four-bit registers? Register A holds the binary number 0101 and register B holds 0111. The carry flip-flop is initially reset to 0.

Ans ✗ A. 1100

✔ B. 0001

✗ C. 1000

✗ D. 0010

Q.12

Determine the power supplied by the dependent current source.

Ans
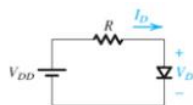
✅ A. 178.32 W

❌ B. 141.2 W

❌ C. 212.4 W

❌ D. 120.37 W

Q.13 For a copper wire with circular cross section (diameter = 1.03 mm) with resistivity = $2.5 \times 10^{-4} \Omega/m$, concentration of free $e^- = 8.4 \times 10^{28}/m^3$ and current density = $2.1 \times 10^6 A/m^2$, determine the mobility of electrons.

Ans

✅ A. $3.567 \times 10^{-3} m^2/V - sec$

❌ B. $1.542 \times 10^{-4} m^2/V - sec$

❌ C. $4.67 \times 10^{-2} m^2/V - sec$

❌ D. $2.173 \times 10^{-5} m^2/V - sec$

Q.14

For the circuit shown in the given figure, determine I_D, if $V_{DD} = 5$ V and R $= 1$ kΩ.

Assume that the diode has a current of 1 mA at a voltage of 0.7 V and uses the ideal-diode model.

Ans

❌ A. 2.4 mA

✅ B. 5 mA

❌ C. 4 mA

❌ D. 4.3 mA

Q.15 The distortion factor for a 3-phase fully controlled bridge rectifier is:

Ans
- ✗ A. $(\pi/3)\cos\alpha$
- ✗ B. $(3/\pi)\cos\alpha$
- ✗ C. $\cos\alpha$
- ✔ D. $3/\pi$

Question ID : **95506774**
Chosen Option : **2**

Q.16 The number of registers and flags in 8086 are:

Ans
- ✗ A. twelve 14-bit registers and 7 flags
- ✗ B. fifteen 14-bit registers and 8 flags
- ✔ C. thirteen 16-bit registers and 9 flags
- ✗ D. eleven 8-bit registers and 6 flags

Question ID : **95506770**
Chosen Option : **3**

Q.17 The inductor of the buck-boost converter, in a flyback converter, has been replaced by a:

Ans
- ✔ A. flyback transformer
- ✗ B. flyback transistor
- ✗ C. flyback capacitor
- ✗ D. flyback resistor

Question ID : **95506778**
Chosen Option : **--**

Q.18 Which of the following statements is INCORRECT in respect of a processor-memory bus?

Ans
- ✗ A. Short and high speed
- ✗ B.
Matched to the memory system to maximize the memory-processor bandwidth
- ✗ C. Optimised for cache block transfers
- ✔ D. Is usually lengthy and slower

Question ID : **95506786**
Chosen Option : **4**

Q.19 Which of the following options is a 3-terminal majority carrier device?

Ans ✗ A. IGBT

✗ B. BJT

✔ C. JFET

✗ D. Thyristor

Question ID : **95506780**
Chosen Option : **2**

Q.20 The composition of constantan is:

Ans ✗ A. Mn = 65% and Zn = 35%

✔ B. Cu = 60% and Ni = 40%

✗ C. Cu = 43%, Ni = 17% and Mn = 40%

✗ D. Sn = 23.43%, Cu = 43.67% and Ni = 32.9%

Question ID : **95506736**
Chosen Option : **2**

Q.21 The resistance of a wire, 1 m long and of 1 mm^2 cross section, is 1/58 Ω. Thus, the resistance of a 2 m long, 0.5 cm thick copper tube with an external diameter of 10 cm will be:

Ans ✗ A. 18.61 $\mu\Omega$

✔ B. 23.14 $\mu\Omega$

✗ C. 23.14 Ω

✗ D. 18.61 Ω

Question ID : **9550673**
Chosen Option : **1**

Q.22 For the same firing angle, the load voltage in the discontinuous conduction mode compared to the continuous conduction mode of operation, will be:

Ans ✗ A. lower

✗ B. constant

✗ C. zero

✔ D. higher

Question ID : **95506775**
Chosen Option : **2**

Q.23 वह घटक, जो मूल सिग्नल की प्रकृति को संरक्षित रखते हुए दिए गए सिग्नल में फेरबदल करता है, क्या कहलाता है?

Ans

✗ A. नियत मैनीपुलेटर (fixed manipulator)

✔ B.

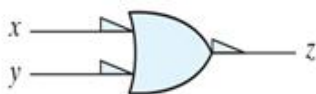परिवर्ती फेरबदल घटक (variable manipulation element)

✗ C.

परिवर्ती रूपांतरण घटक (variable conversion element)

✗ D. नियत कन्वर्टर (fixed converter)

Question ID : 95506758
Chosen Option : 1

Q.24

The given gate represents:

Ans

✗ A. positive logic NAND

✔ B. negative logic OR

✗ C. positive logic OR

✗ D. negative logic XOR

Question ID : 95506750
Chosen Option : 3

Q.25 A 5-bit binary counter starts with 00000. Determine the count after 144 input pulses.

Ans

✗ A. 10100

✗ B. 10101

✗ C. 01001

✔ D. 10000

Question ID : 95506756
Chosen Option : 4

Q.26 Operating modes of 8255A are:

Ans ✔️ A.

mode 0 – basic input/output, mode 1 – strobed input/output, mode 2 – bidirectional data bus

❌ B.

mode 0 – advanced input/output, mode 1 – strobed input/output, mode 2 – unidirectional data bus

❌ C.

mode 0 – control input/output, mode 1 – strobed input/output, mode 2 – basic data bus

❌ D.

mode 0 – basic input/output, mode 1 – control input/output, mode 2 – strobed data bus

Question ID : 95506766
Chosen Option : 4

Q.27 A separately excited 220 V, 10A, 1000 RPM dc motor with armature resistance of 2 Ω is supplied from a 230V, 50Hz, single phase supply through a fully controlled bridge converter. So, the no-load speed of the motor will be:

Ans ❌ A. 1500 RPM

❌ B. 1226 RPM

✔️ C. 1626 RPM

❌ D. 1000 RPM

Question ID : 95506776
Chosen Option : --

Q.28 The gain-bandwidth product, thermal stability and relation between input and output of an FET as compared to a BJT is, respectively:

Ans ❌ A. high, low, linear

❌ B. low, high, linear

✔️ C. low, high, non-linear

❌ D. low, low, non-linear

Question ID : 95506721
Chosen Option : 2

Q.29 Inactive time for RS-232 frame format is:

Ans ✔️ A. − 12 V logic level high

❌ B. − 5 V logic level high

❌ C. + 5 V logic level high

❌ D. + 12 V logic level high

Question ID : 95506783
Chosen Option : 2

Q.30 A 1-mA meter movement with internal resistance of 100 Ω is to be converted into a 0-100 mA ammeter. Calculate the shunt resistance required and specify particulars of the shunt.

Ans
✔ A. 1.0 Ω, 100 mA or 1.0 Ω, 100 mV
✘ B. 1.0 Ω, 150 mA or 1.0 Ω, 100 mV
✘ C. 1.5 Ω, 100 mA or 1.0 Ω, 100 mV
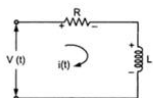✘ D. 1.5 Ω, 100 mA or 1.5 Ω, 100 mV

Question ID : **95506743**
Chosen Option : **1**

Q.31 For a magnetic material, when majority of domains get aligned, the material is said to be:

Ans
✔ A. saturated
✘ B. corrected
✘ C. linear
✘ D. rolled

Question ID : **95506740**
Chosen Option : **1**

Q.32

In the given figure, find the current in s-domain if L = 25 mH, R = 1000 Ω and circuit is subjected to 50 V step input.

Ans
✘ A. $\dfrac{0.05}{s - 4 \times 10^4}$

✘ B. $\dfrac{5}{s + 4}$

✔ C. $\dfrac{0.05}{s} - \dfrac{0.05}{s + 4 \times 10^4}$

✘ D. $\dfrac{0.05}{s}$

Question ID : **95506728**
Chosen Option : **3**

Q.33 Which of the following options is a thermosetting polymer?

Ans
✔ A. Bakelite
✘ B. Teflon
✘ C. PVC
✘ D. Nylon

Question ID : **95506737**
Chosen Option : **--**

Q.34 A PWM inverter can producing output voltage as:

Ans
- ✗ A. fixed voltage, variable frequency
- ✗ B. fixed voltage, fixed frequency
- ✓ C. variable in magnitude and frequency
- ✗ D. variable voltage, fixed frequency

Q.35 A step input of 4 A is applied to an ammeter. The pointer swings to 4.18 A and finally comes to rest at 4.02 A.
Determine the:
a) overshoot of reading in ampere and in percentage of final reading
b) percentage error in instrument

Ans
- ✗ A. a) 0.12 A, 3.7%   b) 0.4%
- ✗ B. a) 0.14 A, 3.8%   b) 0.3%
- ✗ C. a) 0.16 A, 3.2%   b) 0.4%
- ✓ D. a) 0.16 A, 3.98%   b) 0.5%

Q.36 A moving coil voltmeter has a uniform scale with 100 divisions, the full scale reading is 300 V and 1 / 10 of a scale
division can be estimated with a fair degree of certainty. Determine the resolution of the instrument.

Ans
- ✓ A. 0.3 V
- ✗ B. 0.5 V
- ✗ C. 0.2 V
- ✗ D. 0.4 V

Q.37 The peak value of the line voltage in case of 120 ° mode of operation of a three-phase bridge inverter is:

Ans
- ✗ A. $V_s/3$
- ✗ B. $2V_s/3$
- ✗ C. $V_s/2$
- ✓ D. V_s

Q.38 Which of the following is NOT true with reference to microprocessors?

Ans ✗ A. They contain tri-state output pins.

✗ B. 8-bit microprocessors can transmit an address of 16-bit.

✗ C.

Control unit controls the operation of the internal on-chip circuitry.
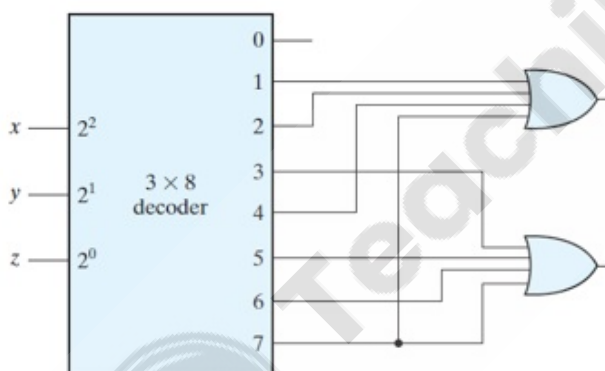
✓ D. Microprocessors don't have an off-chip memory.

Q.39 The disadvantage of using a bridge rectifier configuration is its:

Ans ✗ A. smaller power transformer

✗ B. rectification efficiency

✓ C. increase in total voltage drop

✗ D. lower number of turns in secondary

Q.40
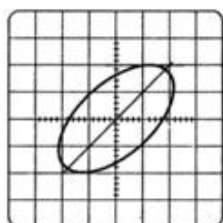

The circuit shown in the given figure represents a/an:

Ans ✓ A. full adder

✗ B. equality detector

✗ C. full subtractor

✗ D. inequality detector

Q.41 For the given Lissajous figure, find the phase difference.

Ans

✔ A. 53.13 °

✘ B. 26.56 °

✘ C. 27.67 °

✘ D. 44.64 °

Q.42 FETs are preferred in amplifiers for their:

Ans

✘ A. small size

✔ B. high input impedance

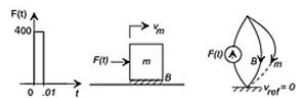✘ C. unipolar nature

✘ D. temperature dependence

Q.43
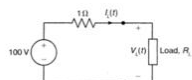
In the circuit shown in the given figure for a full load current of 10 A, source loading occurs at what value of resistance?

Ans

✔ A. beyond 9 Ω

✘ B. 8 Ω

✘ C. 7 Ω

✘ D. 4 Ω

Q.44 A mass m = 20 kg is at rest on a horizontal plane with viscous friction coefficient B = 40 N-s/m, as shown in the Fig. below:

A short impulsive force of amplitude 400 N and duration 0.01s is applied. The system time constant will be:

Ans
❌ A. 2 secs

❌ B. 5 secs

✅ C. 0.5 secs

❌ D. 1 sec

Q.45 Which of the following options is the correct sequential order of a four-level model of the evolution of quality management?

Ans
✅ A.
1-Inspection 2- Quality Control 3- Quality Assurance 4- Total Quality Management

❌ B.
1-Quality Assurance 2-Total Quality Management 3- Inspection 4- Quality Control

❌ C.
1-Quality Assurance 2- Quality Control 3- Total Quality Management 4- Inspection

❌ D.
1-Inspection 2- Quality Assurance 3- Quality Control 4- Total Quality Management

Q.46 With respect to the flux shown in the figure, select the correct option corresponding to a, b and c, respectively.

Ans
❌ A. Diamagnetic, paramagnetic and ferromagnetic

✅ B. Ferromagnetic, paramagnetic and diamagnetic

❌ C. Paramagnetic, ferromagnetic and diamagnetic

❌ D. Paramagnetic, diamagnetic and ferromagnetic

Q.47 Interrupt OUT Transaction in USB 2.0 functions when:

Ans ✗ A. the host will periodically poll the interrupt endpoint

✗ B.
the host sends an IN token, the function responds with a DATA packet, and the host acknowledges

✓ C. the host wants to send the device interrupt data

✗ D. the polling rate is specified in the endpoint descriptor

Question ID : 95506782
Chosen Option : 2

Q.48 Find the frequency of sustained oscillation (in rad/sec) for the system $s^4 + 9s^3 + 11s^2 + 6s + k = 0$

Ans ✗ A. 0.36 rad/sec

✓ B. 0.82 rad/sec

✗ C. 0.22 rad/sec

✗ D. 0.14 rad/sec

Question ID : 95506748
Chosen Option : --

Q.49 The moving coil in an electrodynamometer wattmeter is called:

Ans ✗ A. current coil

✗ B. power coil

✓ C. pressure coil

✗ D. meter coil

Question ID : 95506741
Chosen Option : 3

Q.50 Calculate the number of electrons that pass through the cross section/hour of the filament of a 60 W bulb which has a current of 0.5 A flowing through it (in electrons / hour).

Ans ✗ A. 1.1×10^{18}

✗ B. 3.1×10^{22}

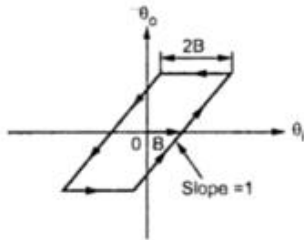✗ C. 3.1×10^{18}

✓ D. 1.1×10^{22}

Question ID : 9550672
Chosen Option : 4

Q.51 The most expensive category of quality costs is:

Ans ✔ A. external failure costs

✘ B. appraisal costs

✘ C. prevention costs

✘ D. internal failure costs

Q.52

The given figure represents:

Ans ✘ A. limit cycle

✘ B. Linearity

✔ C. Backlash

✘ D. jump resonance

Q.53 What is the number of T-states required to execute the following instruction?

LHLD addr16

(Note: addr16 is any 16-bit address)

Ans ✘ A. 10T

✘ B. 7T

✘ C. 6T

✔ D. 13T

Q.54 Determine the average emf induced in a coil of 200 turns wound on a magnetic circuit having reluctance 2000 AT / Wb, if a current of 1 A flowing in the coil is reversed in 10 ms.

Ans ✗ A. 10 V

✗ B. 2 V

✔ C. 4 V

✗ D. 6 V

Question ID : **9550674**
Chosen Option : **2**

Q.55 The first stage of a measurement system is known as the:

Ans ✗ A. conversion stage

✗ B. digital stage

✗ C. contact stage

✔ D. detector-transducer stage

Question ID : **95506757**
Chosen Option : **4**

Q.56 Beyond a certain temperature, for insulators the forbidden gap can be crossed when dielectric strength of solid breaks down under:

Ans ✔ A. high voltage

✗ B. low pressure

✗ C. low voltage

✗ D. high pressure

Question ID : **95506734**
Chosen Option : **1**

Q.57 When the main purpose of a control system is to reject disturbance effect and desired value of controlled output is almost fixed, such a control system is also called a:

Ans ✔ A. regulator

✗ B. manipulator

✗ C. rectifier

✗ D. tracker

Question ID : **95506723**
Chosen Option : **1**

Q.58 The costs created from the effort to reduce poor quality are called:

Ans ✗ A. external failure costs

✗ B. internal failure costs

✗ C. appraisal costs

✔ D. prevention costs

Q.59 What value would come in place of the question mark (?) in the given equation?

$(173.513)_{10} = (?)_8$

Ans ✗ A. 231.4065

✗ B. 255.0101

✗ C. 211.4214

✔ D. 255.4065

Q.60
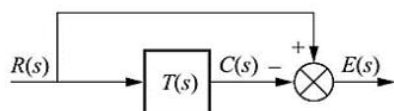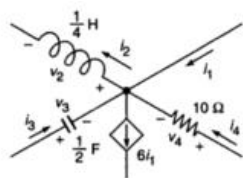

For the figure given above if, $T(s) = \frac{5}{s^2 + 7s + 10}$ and $R(s) = \frac{1}{s}$, then the steady state error will be:

Ans ✗ A. 1

✗ B. infinity

✗ C. 0

✔ D. $\frac{1}{2}$

Q.61

In the given figure, $i_1 = -0.5e^{-2t}$; $v_3 = 2e^{-2t}$ and $v_4 = 5e^{-2t}$. Find v_2.

Ans

✔ A. $0.5e^{-2t}$

✘ B. $0.2e^{-2t}$

✘ C. $2e^{-2t}$

✘ D. $5e^{-t}$

Q.62 General Purpose Interface Bus (GPIB) has a typical maximum speed of:

Ans

✘ A. 115 kbits/s

✘ B. 12 Mbits/s

✘ C. 10 Mbits/s

✔ D. 1 MB/s

Q.63 A coil has a mean area of 200 cm^2 and the number of turns is 1000. It is held perpendicular to a uniform field of 0.2 Gauss and turned through 180° in 1/10 second; the average induced emf will be:

Ans

✘ A. 1.25 V

✘ B. 2.3 V

✔ C. 0.08 V

✘ D. 2 V

Q.64 A vibration galvanometer is used as a detector in a:

Ans

✘ A. Maxwell bridge

✘ B. low voltage Schering bridge

✔ C. high voltage Schering bridge

✘ D. Wheatstone bridge

Q.65 The most suitable material for manufacturing of LED is:

Ans   ✔ A. GaAsP

   ✘ B. ZnP

   ✘ C. ZnO

   ✘ D. IgZO

Q.66 The coil of a moving coil voltmeter is 40 mm long, 20 mm wide and has 100 turns on it. Control spring exerts a torque of 220×10^{-6} N-m when the deflection is 100 divisions on full scale. If the flux density of magnetic field in air gap is 1.0 Wb/m², then estimate the resistance to be put in series with coil to give one volt per division. (Neglect coil resistance)

Ans   ✘ A. 50 kΩ

   ✘ B. 40 kΩ

   ✘ C. 20 kΩ

   ✔ D. 36.36 kΩ

Q.67

B₇	B₆	B₅	B₄	B₃	B₂	B₁	B₀

For an 8237 control word format as shown in the figure, the bit(s) used to read/write/verify transfer is/are:

Ans   ✘ A. Only B_2

   ✘ B. Only B_5

   ✘ C. B_1 and B_0

   ✔ D. B_2 and B_3

Q.68 The power factor of a single-phase half controlled bridge converter is given as:

Ans

❌ A. $\dfrac{\sqrt{2}}{\sqrt{(\pi - a)}} \cos a$

✅ B. $\dfrac{\sqrt{2}}{\sqrt{\pi(\pi - a)}}(1 + \cos a)$

❌ C. $\dfrac{\sqrt{2}}{\sqrt{\pi(\pi - a)}} \cos a$

❌ D. $\dfrac{\sqrt{2}}{\sqrt{(\pi - a)}}(1 + \cos a)$

Q.69 Calculate the drift velocity of electrons for an n type Si having length of 5 cm and circular cross section of 10 mm^2 when it is subjected to a voltage of 1 V across its length. Current flowing through it is 5 mA. Assume charge of $e^- = 1.6 \times 10^{-19}$ and mobility of $e^- = 1300$ cm^2/V $-$ s.

Ans

❌ A. 6.4 m / s
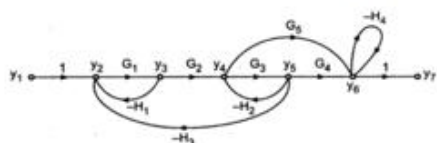
❌ B. 12 m / s

❌ C. 4 m / s

✅ D. 2.6 m / s

Q.70 The method in which the test instrument is compared with the response of a standard instrument of the same type is called:

Ans

❌ A. comparative calibration methodology

❌ B. standard calibration methodology

✅ C. indirect comparison calibration methodology

❌ D. direct comparison calibration methodology

Q.71 In the given figure, find $\dfrac{y_7}{y_2}$

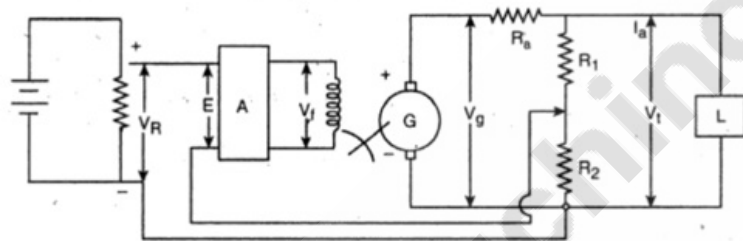**Ans**

✔ A. $\dfrac{G_1G_2G_3G_4 + G_1G_2G_5(1+G_3H_2)}{1+G_3H_2+H_4+G_3H_2H_4}$

✘ B. $\dfrac{G_1G_2G_4 + G_1G_2G_5(1+G_3H_2)}{1-G_3H_2+H_4+G_3H_2H_4}$

✘ C. $\dfrac{G_1G_2G_3G_4 + G_1G_5(1+G_3H_2)}{1+G_3H_2+H_4+G_3H_2H_4}$

✘ D. $\dfrac{G_1G_2G_3G_4 - G_2G_5H_2}{1+G_3H_2+H_4+G_3H_2H_4}$

Question ID : 95506731
Chosen Option : --

Q.72

For the system shown in the given figure, the error voltage (E) is given by:

Ans

✔ A. $V_R - \left(V_t\dfrac{R_2}{R_1+R_2}\right)$

✘ B. $V_R + \left(V_t\dfrac{R_2}{R_1+R_2}\right)$

✘ C. $\left(V_t\dfrac{R_2}{R_1+R_2}\right)$

✘ D. $V_R - V_t$

Question ID : 95506727
Chosen Option : --

Q.73 Which of the following statements is INCORRECT?

Ans ✔ A.

Similar to the MOSFET, the IGBT has a low impedance gate.

✘ B.

Similar to the MOSFET, the IGBT has a high impedance gate.

✘ C.

Similar to the GTO, the IGBT can be designed to block negative voltage.

✘ D. Like the BJT, the IGBT has a small on-state voltage.

Q.74 In 8086 addressing when $\overline{BHE}$ and A_0 are 0 and 1, respectively, what is read/written?

Ans ✘ A. Nothing is read/written

✘ B. 1 byte from/to even address

✔ C. 1 byte from/to odd address

✘ D. One 16-bit word

Q.75 For a particular circuit base, current = 14.46 μA , the emitter current = 1.460 mA, and the base–emitter voltage = 0.7 V. Calculate the saturation current.

Ans ✔ A. 10^{-15}A

✘ B. 10^{-11}A

✘ C. 10^{-10}A

✘ D. 10^{-12}A

Q.76 Which of the following is NOT a reason for companies to estimate quality costs?

Ans ✘ A.

To identify opportunities for reducing customer dissatisfaction.

✘ B.

Quantifying the size of the quality problem in the language of money improves communication between middle managers and upper managers.

✘ C. To identify major opportunities for cost reduction.

✔ D. To identify major opportunities to increase cost.

Q.77 Which of the following is NOT true of a limit cycle?

Ans ✅ A. Oscillation peculiar to linear systems.

❌ B. Characterised by constant amplitude and frequency.

❌ C.
Amplitude of oscillations independent of initial conditions.

❌ D. Easily recognised in the phase plane.

Q.78 For the circuit shown in the given figure, find the value of R so as to obtain an output voltage of 2.4 V.

(Assume diodes have a drop of 0.7 V at 1 mA.)

Ans ❌ A. 220 Ω

✅ B. 139 Ω

❌ C. 190 Ω

❌ D. 120 Ω
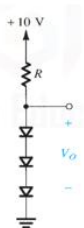
Q.79
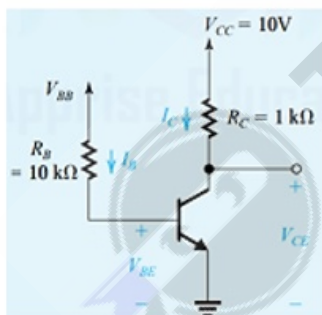
Find V_{BB} if the circuit (in the given figure) has to operate at the edge of saturation (Use $V_{BE} = 0.7$ V and $\beta = 50$).

Ans ❌ A. 1.25 V

❌ B. 4.12 V

❌ C. 3.58 V

✅ D. 2.64 V

Q.80 Calculate the precision of 3ʳᵈ measurement from the data given below:

Measurement no.	Value
1	48
2	50
3	51
4	49
5	48

Ans ✔ A. 96.34%

✘ B. 95.46%

✘ C. 96.40%

✘ D. 95.34%

Q.81 A highly sensitive galvanometer can detect a current as low as 0.1 nA. This galvanometer is used in a Wheatstone bridge as a detector. Each arm of the bridge has a resistance of 2 kΩ. The input voltage applied to the bridge is 20 V. Calculate the smallest change in resistance which can be detected.

Ans ✘ A. 50 μΩ

✔ B. 80 μΩ

✘ C. 40 μΩ

✘ D. 20 μΩ

Q.82 Select the FALSE statement with respect to variable frequency operation control strategy in DC-DC converters.

Ans ✘ A. Large OFF time in frequency modulation technique

✘ B. Possibility of interference

✔ C. Very small OFF time makes load current continuous

✘ D. Difficult filter design

Q.83 A decoder having an enable input is termed as:

Ans ✘ A. decoder-converter

✘ B. selective decoder

✘ C. enabled-decoder

✔ D. decoder-demultiplexer

Q.84 For a varactor diode with diffused junction at reverse bias voltage of 7.3 V, if the junction potential is 0.7 V and transition capacitance is 40pF, then the constant K will be:

Ans
- ✗ A. 40×10^{-10}
- ✗ B. 20×10^{-11}
- ✓ C. 80×10^{-12}
- ✗ D. 64×10^{-14}

Q.85 $I(s) = \frac{C(s)}{1+sRC} V(s)$ is the current passing through a series RC circuit. Find initial value of current if $R = 3 \, M\Omega$, $C = 1$ μF and supply is 100 V step voltage

Ans
- ✗ A. 26.67 μA
- ✗ B. 14.26 μA
- ✓ C. 33.33 μA
- ✗ D. 28.68 μA

Q.86 ALU in a microprocessor executes:

Ans
- ✗ A. all arithmetic and few logic instructions
- ✓ B. all arithmetic and logic instructions
- ✗ C. all arithmetic instructions only
- ✗ D. a few arithmetic instructions only

Q.87 JMP addr16 is a:

(Note: addr16 is any 16 bit address)

Ans
- ✗ A. 1-byte instruction
- ✓ B. 3-byte instruction
- ✗ C. 4-byte instruction
- ✗ D. 2-byte instruction

Q.88
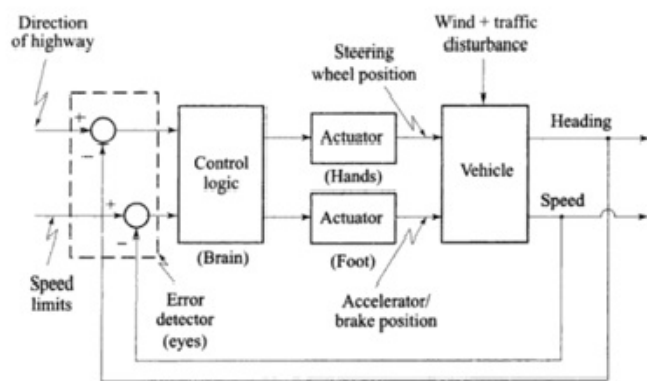
The control system illustrated in the figure is an example of a/an:

Ans ✔ A. man-machine control system

✘ B. automatic closed loop control system

✘ C. open loop control system

✘ D. closed loop control system

Q.89

The circuit shown in the given figure represents a/an:

Ans ✘ A. full adder

✘ B. decoder

✘ C. equality detector

✔ D. full subtractor

Q.90 SH1 code in GPIB capabilities functions as:

Ans ✗ A. acceptor handshake capability

✗ B. basic talker

✓ C. source handshake capability

✗ D. basic listener

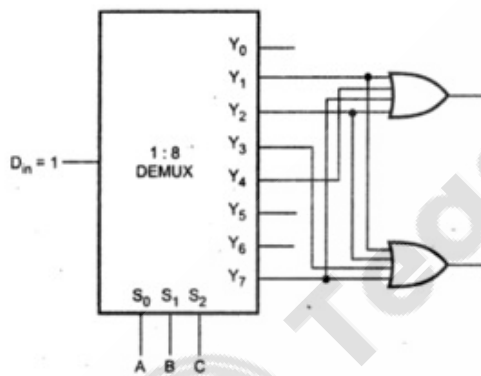Section : **Quantitative Aptitude & Logical Ability**

Q.1 उत्पाद 'X' के प्रति पैक का नियमित मूल्य ₹25 है। यदि प्रति पैक नियमित मूल्य पर 25 प्रतिशत की छूट दी जाए, तो ऐसे 80 उत्पादों का मूल्य क्या होगा?

Ans ✗ A. 1050

✓ B. 1500

✗ C. 2000

✗ D. 1250

Q.2 Select the number that can replace the question mark (?) in the following series.

5, 10, 30, 120, 600, ?

Ans ✓ A. 3600

✗ B. 4000

✗ C. 2400

✗ D. 1800

Q.3 राम और श्याम क्रमशः ₹5 लाख और ₹4 लाख के निवेश के साथ एक व्यवसाय शुरू करते हैं। 8 महीने के बाद, राम ₹1 लाख निकाल लेता है और मोहन ₹2 लाख के निवेश के साथ व्यवसाय में प्रवेश करता है। वर्ष के अंत में लाभ ₹2,80,000 है। लाभ में मोहन का हिस्सा ज्ञात कीजिए।

Ans ✗ A. ₹24,000

✗ B. ₹28,000

✗ C. ₹14,000

✓ D. ₹20,000
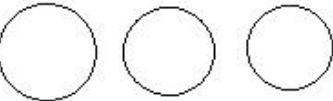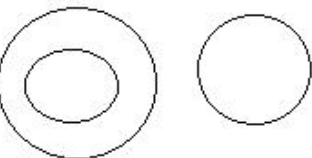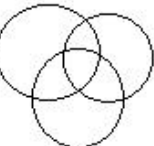
Q.4 Select the Venn diagram that best represents the relationship between the following classes.

Physics, Chemistry, Science

Ans

✗ A.

✓ B.

✗ C.

✗ D.

Q.5 सुपरमैन, अपने छिपने के स्थान से पूर्व की ओर 400 m उड़ा। फिर वह बाईं ओर मुड़ा और 400 m उड़ा। इसके बाद वह फिर से बाईं ओर मुड़ा और 200 m उड़ा। फिर से वह बाईं ओर मुड़ा और 200 m उड़ा। अब सुपरमैन के सामने की ओर कौन सा दिशा है?

Ans

✗ A. पूर्व

✗ B. उत्तर

✓ C. दक्षिण

✗ D. पश्चिम

Q.6 दी गई तालिका पांच अलग-अलग विश्वविद्यालयों A, B, C, D और E के उन विद्यार्थियों की संख्या को प्रदर्शित करती है, जिन्होंने 5 महीने के दौरान स्वैच्छिक रूप से रक्तदान शिविर में भाग लिया है।

विश्वविद्यालय \ माह	A	B	C	D	E
जनवरी	300	500	250	410	350
फरवरी	400	400	280	500	430
मार्च	450	360	240	450	320
अप्रैल	500	300	400	320	450
मई	430	440	540	500	510

फरवरी में विश्वविद्यालय B के स्वैच्छिक रूप से भाग लेने वाले विद्यार्थियों की संख्या, सभी 5 माह के दौरान विश्वविद्यालय B के स्वैच्छिक रूप से भाग लेने वाले विद्यार्थियों की कुल संख्या के कितने प्रतिशत (लगभग) के बराबर है?

Ans ✗ A. 25%

✗ B. 30%

✗ C. 10%

✔ D. 20%

Question ID : 955067103
Chosen Option : --

Q.7 In a certain code language, 'WITCH' is coded as '126'. How will 'WIZARD' be coded as in that code language?

Ans ✗ A. 189

✔ B. 162

✗ C. 154

✗ D. 178

Question ID : 955067107
Chosen Option : 2

Q.8 Select an option that relates to 'Deer' in the same manner as 'Man' is related to 'Child'.

Ans ✗ A. Doe

✗ B. Stag

✗ C. Cub

✔ D. Fawn

Question ID : 955067106
Chosen Option : --

Q.9 एक वृत्त की वह जीवा, जिसकी लंबाई वृत्त की त्रिज्या के बराबर है, उस वृत्त के केंद्र पर _____ रेडियन मान का कोण अंतरित करती है।

Ans
- ✗ A. $2\pi/3$
- ✗ B. $\pi/4$
- ✔ C. $\pi/3$
- ✗ D. $\pi/2$

Q.10 निम्नलिखित प्रश्न में चार शब्द दिए गए हैं, जिनमें से तीन किसी प्रकार से संगत हैं, जबकि चौथा असंगत है। असंगत शब्द का चयन कीजिए।

Ans
- ✔ A. हिरण
- ✗ B. लोमड़ी
- ✗ C. शेर
- ✗ D. बाघ

Q.11 If $A^3 + B^3 = 200$ and $AB = 13$, the value of A+B is

Ans
- ✗ A. 6
- ✔ B. 8
- ✗ C. 7
- ✗ D. 5

Q.12 दो वृत्तों की त्रिज्याएं 5 और 6 हैं, और उनके केंद्रों के बीच की दूरी 10 है। दोनों वृत्तों पर खींची जा सकने वाली उभयनिष्ठ स्पर्श रेखाओं की संख्या कितनी है?

Ans
- ✔ A. 2
- ✗ B. 4
- ✗ C. 1
- ✗ D. 3

Q.13 100 मीटर ऊंचाई वाले एक टॉवर के शीर्ष से, टॉवर की ओर आने वाली कार का अवनमन कोण 10 सेकंड में 30 डिग्री से बदलकर 60 डिग्री हो जाता है। कार की चाल लगभग _____ km/hr है।

Ans ✗ A. 60

✔ B. 40

✗ C. 20

✗ D. 30

Question ID : 95506799

Chosen Option : --

Q.14 Two cars start simultaneously from A and B towards each other, where AB =50 km. They cross each other after one hour. The car at A arrives at B 5/6 hours earlier than the time the car at B arrives at A. The speed of the car at A is

Ans ✗ A. 25

✗ B. 20

✗ C. 15

✔ D. 30

Question ID : 95506796

Chosen Option : --

Q.15 यदि '+' का अर्थ 'भाग', '−' का अर्थ 'जोड़', '×' का अर्थ 'घटाव' और '÷' का अर्थ 'गुणा' है, तो निम्नलिखित व्यंजक का मान क्या होगा?

$[\{(22 \times 12) \div 3\} + (3 - 7)]/2$

Ans ✔ A. 6

✗ B. 4

✗ C. 2

✗ D. 8

Question ID : 955067105

Chosen Option : --

Q.16 पाइप A एक टैंक को 40 घंटे में भर सकता है। पाइप A और B मिलकर इसे 24 घंटे में भर सकते हैं। एक रिसाव के कारण, B टैंक को 80 घंटे में भर सकता है। यह रिसाव भरे हुए टैंक को कितने घंटे में खाली कर सकता है?

Ans ✗ A. 200

✗ B. 220

✔ C. 240

✗ D. 260

Question ID : 95506795

Chosen Option : --

Q.17 M और N, 0 से 9 के बीच के कोई दो अंक हैं। M और N के क्रमश: वे न्यूनतम मान बताइए, जिनके लिए संख्या 23M5N, 12 से पूर्णतया विभाज्य हो।

Ans
✗ A. 0 और 0
✗ B. 2 और 2
✔ C. 0 और 2
✗ D. 2 और 0

Q.18 निर्देश: नीचे दी गई जानकारी ध्यानपूर्वक पढ़ें और दिए गए प्रश्न का उत्तर दें।

पांच मित्र L, M, N, O और P का वजन असमान है। L का वजन M से अधिक है, लेकिन P से कम है। O का वजन केवल N से अधिक है। जिसका वजन 30 kg है, उसका वजन इन सभी में से सर्वाधिक है। M का वजन 15 kg है।

इनमें से किसका वजन संभवतः 20 kg है?

Ans
✔ A. L
✗ B. P
✗ C. O
✗ D. N

Q.19 A एक कार्य को 20 दिनों में पूरा कर सकता है। A और B एक साथ मिलकर उसी कार्य को 15 दिनों में पूरा कर सकते हैं, तथा A, B, और C एक साथ मिलकर उसे 10 दिनों में पूरा कर सकते हैं। तो A और C एक साथ मिल कर उस कार्य को कितने दिनों में पूरा कर सकते हैं?

Ans
✗ A. 14
✗ B. 11
✗ C. 13
✔ D. 12

Q.20 The day of 1st April, 2025 will be

Ans
✗ A. Sunday
✔ B. Tuesday
✗ C. Wednesday
✗ D. Monday

Q.1 Parts of a sentence are given below in jumbled order. Arrange the parts in the right order to form a meaningful sentence.

like/ like/ brothers/ strangers/ get/ together/ together/ but/ work

Ans ✔️ A.

Get together like brothers but work together like strangers.

❌ B.

Together get like brothers but together work like strangers.

❌ C.

Like brothers work together but get like strangers together.

❌ D.

Strangers get together like brothers but like work together.

Question ID : **955067119**
Chosen Option : --

Q.2 Select the most appropriate synonym of the given word.

MARVEL

Ans ✔️ A. wonder

❌ B. ordinary

❌ C. ignore

❌ D. normal

Question ID : **955067115**
Chosen Option : --

Q.3 Select the most appropriate ANTONYM of the given word.

NEAT

Ans ✔️ A. messy

❌ B. tidy

❌ C. arranged

❌ D. meticulous

Question ID : **955067116**
Chosen Option : --

Q.4 Select the option that expresses the given sentence in passive voice.

The government is planning a new tax on services.

Ans ✗ A.

A new tax on services are being planned by the government.

✔ B.

A new tax on services is being planned by the government.

✗ C.

A new tax on services is being planning by the government.

✗ D.

A new tax on services was being planned by the government.

Q.5 Select the correctly spelt word.

Ans ✗ A. beggining

✗ B. biginning

✗ C. begining

✔ D. beginning

Q.6 Parts of the following sentence are given as options. Identify the part that has an error.

Sam may not to join the selection committee after all.

Ans ✗ A. after all

✔ B. to join

✗ C. Sam may not

✗ D. the selection committee

Q.7 Select the option that expresses the given sentence in indirect speech.

Amir asked me, "Why didn't you answer the phone?"

Ans ✔ A. Amir asked me why I hadn't answered the phone.

✘ B. Amir asked me why I didn't answer the phone.

✘ C. Amir asked me why I haven't answered the phone.

✘ D. Amir asked me why I answered the phone.

Question ID : 955067113
Chosen Option : 2

Q.8 Select the most appropriate meaning of the underlined idiom in the given sentence.

We come from different departments but now we are all in the same boat.

Ans ✘ A. forced together

✘ B. having to row together

✘ C. going to a new destination

✔ D. facing the same unpleasant situation

Question ID : 955067118
Chosen Option : 4

Q.9 Select the option that can be used as a one-word substitute for the given phrase.

A person who studies the buildings and objects of people who lived in the past

Ans ✘ A. an anthropologist

✔ B. an archaeologist

✘ C. a historian

✘ D. a sociologist

Question ID : 955067120
Chosen Option : 3

Q.10 Select the most appropriate option to fill in the blank.

Visitors are required to _____ about who they want to meet.

Ans ✘ A. informing

✘ B. informed

✔ C. inform us

✘ D. inform

Question ID : 955067114
Chosen Option : 4

Q.1 Which of the following bacteria helps to improve nitrogen compounds in the soil?

Ans ✘ A. Faecium

✘ B. Lugdenenis

✘ C. Staph aureus

✔ D. Rhizobium

Question ID : **955067130**
Chosen Option : --

Q.2 निम्नलिखित में से कौन सी हस्ती राष्ट्रीय कांग्रेस पार्टी से संबंधित हैं?

Ans ✘ A. शरद यादव

✘ B. वैभव गहलोत

✘ C. ललित मोदी

✔ D. सुप्रिया सुले

Question ID : **955067135**
Chosen Option : **4**

Q.3 Which of the following is not a good source of Vitamin C?

Ans ✘ A. Strawberries

✔ B. Milk

✘ C. Sweet potato

✘ D. Green pepper

Question ID : **955067127**
Chosen Option : --

Q.4 निम्नलिखित में से कौन एक प्रसिद्ध ठुमरी गायिका थीं?

Ans ✘ A. लक्ष्मी देवी

✔ B. गिरिजा देवी

✘ C. संतोषी देवी

✘ D. मणि देवी

Question ID : **955067122**
Chosen Option : --

Q.5 बैंकिंग की भाषा में, NPA का पूर्ण रूप क्या है?

Ans
  ✔ A. Non Performing Asset (नॉन परफार्मिंग असेट)

  ✘ B. Net Performing Asset (नेट परफार्मिंग असेट)

  ✘ C. Null Performing Asset (नल परफार्मिंग असेट)

  ✘ D. Notable Performing Asset (नोटेबल परफार्मिंग असेट)

Question ID : **955067124**
Chosen Option : --

Q.6 Which of the following rivers does not flow through Punjab?

Ans
  ✔ A. Yamuna

  ✘ B. Sutlej

  ✘ C. Ravi

  ✘ D. Jhelum

Question ID : **955067128**
Chosen Option : --

Q.7 As per the preamble to the Indian Constitution, India is a ...

Ans
  ✔ A. Sovereign Socialist Secular Democratic Republic

  ✘ B. Independent, Sovereign People's Republic

  ✘ C. People's Republic of India

  ✘ D. Sovereign Communist Secular Democratic Republic

Question ID : **955067125**
Chosen Option : **1**

Q.8 इनमें से किसे 2019 में कुश्ती के लिए राजीव गांधी खेल रत्न पुरस्कार से सम्मानित किया गया?

Ans
  ✘ A. जीतू राय

  ✔ B. बजरंग पुनिया

  ✘ C. देवेंद्र झाझारिया

  ✘ D. दीपा मलिक

Question ID : **955067134**
Chosen Option : --

Q.9 भारत सरकार 2019 के अंत तक इनमें से किस सार्वजनिक क्षेत्र उपक्रम (पीएसयू) में अपनी हिस्सेदारी को घटाकर 51% से कम करने का विचार कर रही है?

Ans
- ✔ A. इंडियन ऑयल कॉर्पोरेशन (आई.ओ.सी.)
- ✘ B. रक्षा अनुसंधान एवं विकास संगठन (डी.आर.डी.ओ.)
- ✘ C. भारतीय स्टेट बैंक (एस.बी.आई.)
- ✘ D. हिंदुस्तान एयरोनॉटिक्स लिमिटेड (एच.यू.एल.)

Question ID : **955067123**
Chosen Option : --

Q.10 2001 की जनगणना के अनुसार सर्वाधिक जनसंख्या वाला भारतीय राज्य कौन सा है?

Ans
- ✘ A. महाराष्ट्र
- ✔ B. उत्तर प्रदेश
- ✘ C. मध्य प्रदेश
- ✘ D. बिहार

Question ID : **955067131**
Chosen Option : --

Q.11 Which of the following scientists developed the periodic table, arranging chemical elements by atomic mass?

Ans
- ✘ A. Galileo Galilei
- ✔ B. Dmitri Mendeleev
- ✘ C. Isaac Newton
- ✘ D. Stephen Hawking

Question ID : **955067126**
Chosen Option : --

Q.12 The Parsis, whose name means "Persians," are descended from Persian Zoroastrians, who mainly immigrated to India from _____.

Ans
- ✘ A. Afghanistan
- ✔ B. Iran
- ✘ C. Iraq
- ✘ D. Russia

Question ID : **955067133**
Chosen Option : --

Q.13 Who among the following is a famous Kathak dancer?

Ans
- ✗ A. Pandit Bhimsen Joshi
- ✗ B. Pandit Kumar Gandharva
- ✔ C. Birju Maharaj
- ✗ D. Dr Balamuralikrishna

Question ID : **955067121**
Chosen Option : --

Q.14 What was the name of a series of meetings in three sessions called by the British government to consider the future constitution of India?

Ans
- ✔ A. Round Table Conference
- ✗ B. Collective Conference
- ✗ C. Indian Legislative Conference
- ✗ D. Indian Constitutional Conference

Question ID : **955067139**
Chosen Option : --

Q.15 Which Article of the Indian Constitution gives power to the Governor to appoint the Chief Minister of the state?

Ans
- ✗ A. Article 166
- ✗ B. Article 165
- ✔ C. Article 164
- ✗ D. Article 167

Question ID : **955067137**
Chosen Option : --

Q.16 Pashupatinath temple in Khatmandu is regarded as the oldest Hindu temple in Khatmandu. According to local legend, Pashupatinath is an incarnation of Lord _____.

Ans
- ✔ A. Shiva
- ✗ B. Brahma
- ✗ C. Vishnu
- ✗ D. Krishna

Question ID : **955067132**
Chosen Option : --

Q.17 India's gross domestic product (GDP) for the period July-September 2019 showed a growth rate of _____.

Ans
- ✗ A. 5.4%
- ✗ B. 6.2%
- ✗ C. 5.7%
- ✔ D. 4.5%

Question ID : **955067140**
Chosen Option : --

Q.18 Guru Shikhar, a peak in the Arbuda Mountains, is located in which of the following states of India?

Ans
- ✗ A. Himachal Pradesh
- ✗ B. Maharashtra
- ✗ C. Karnataka
- ✔ D. Rajasthan

Question ID : **955067129**
Chosen Option : --

Q.19 After successfully hosting the 2018 Men's Hockey World Cup, which of the following Indian states will once again host the 2023 edition of the tournament?

Ans
- ✗ A. West Bengal
- ✗ B. Karnataka
- ✗ C. Tamil Nadu
- ✔ D. Odisha

Question ID : **955067136**
Chosen Option : --

Q.20 Which of the following states/union territories is NOT known for apple production in India?

Ans
- ✔ A. Odisha
- ✗ B. Jammu & Kashmir
- ✗ C. Uttarakhand
- ✗ D. Himachal Pradesh

Question ID : **955067138**
Chosen Option : --