Delhi Development Authority
(Recruitment Cell)
Advertisement No. 03/2022/Rectt.Cell./Pers./DDA

Participant ID	
Participant Name	
Test Center Name	iON Digital Zone iDZ 1 GT Karnal Road
Test Date	03/04/2023
Test Time	12:30 PM - 2:30 PM
Subject	Junior Engineer (Electrical or Mechanical)

Section : **Domain Questions (Electrical)**

Q.1 Arrange the following materials in the ascending order of their resistivity:

Carbon, glass, copper

Ans ✗ 1. Carbon, glass, copper

✔ 2. Copper, carbon, glass

✗ 3. Copper, glass, carbon

✗ 4. Glass, copper, carbon

Question ID : **630680197938**
Status : **Answered**
Chosen Option : **2**

Q.2 An EMF of 0.25 V is induced in a coil when the flux changes at a rate of 1 mWb/s. Calculate the number of turns in the coil.

Ans ✗ 1. 125

✗ 2. 25

✗ 3. 50

✔ 4. 250

Question ID : **630680197947**
Status : **Answered**
Chosen Option : **4**

Q.3 An 8-pole lap-connected DC generator has 480 conductors, and it generates 500 V. If the flux per pole is 50 mWb, find the speed of the generator.

**Ans** ✗ 1. 1500 rpm

✗ 2. 1000 rpm

✗ 3. 750 rpm

✔ 4. 1250 rpm

Question ID : **630680197972**
Status : **Answered**
Chosen Option : **4**

Q.4 Which of the following laws states that the voltage across a resistor is directly proportional to the current 'i' flowing through the resistor?

Ans ✗ 1. Kirchhoff's law

✓ 2. Ohm's law

✗ 3. Lenz's law

✗ 4. Faraday's law

Q.5 For the following circuit, find the power dissipated in the resistor.
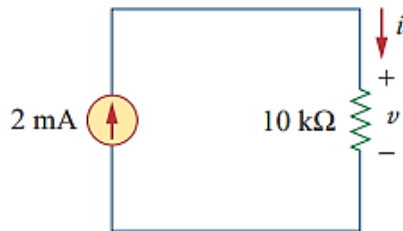
Ans ✗ 1. 4 W

✗ 2. 400 mW

✗ 3. 4 mW

✓ 4. 40 mW

Q.6 In split-phase induction motors, the starting current is _____ the full load current.

Ans ✗ 1. 3 to 4 times

✗ 2. 8 to 10 times

✓ 3. 6 to 8 times

✗ 4. 10 to 12 times

Q.7 In a 20-pole synchronous motor, if the rotor is retarded by 0.5° (mechanical) from its synchronous position, then compute the rotor displacement in electrical degrees.

Ans ✗ 1. 15°

✗ 2. 2.5°

✓ 3. 5°

✗ 4. 10°

Question ID : 630680197971
Status : **Answered**
Chosen Option : **3**

Q.8 The underground distribution system is advantageous over the overhead distribution system in terms of _____.

Ans ✗ 1. flexibility

✗ 2. initial cost

✗ 3. current-carrying capacity

✓ 4. public safety

Question ID : 630680197961
Status : **Answered**
Chosen Option : **3**

Q.9 In a DC generator, the field resistance line is the plot of the _____ versus the _____.

Ans ✗ 1. resistance R_a in armature circuit, armature current I_a

✗ 2. terminal voltage, armature current

✗ 3. resistance R_f in field circuit, field current I_f

✓ 4. voltage $I_f R_f$ across field circuit, field current I_f

Question ID : 630680197974
Status : **Not Answered**
Chosen Option : --

Q.10 A coil of 8 H is tightly coupled with another coil of 18 H. Find the mutual inductance between the two coils.

Ans ✗ 1. 10 H

✗ 2. 18 H

✗ 3. 8 H

✓ 4. 12 H

Question ID : 630680197948
Status : **Answered**
Chosen Option : **4**

Q.11 Among the generalized circuit constants of transmission line, which constants are dimensionless?

Ans ✗ 1. Constant A and Constant B

✔ 2. Constant D and Constant A

✗ 3. Constant C and Constant D
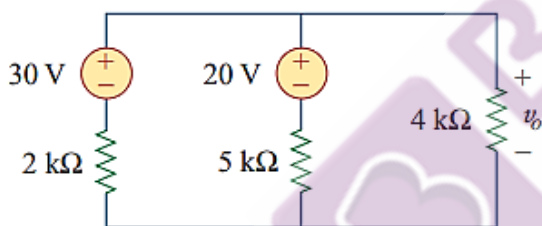
✗ 4. Constant B and Constant C

Q.12 _____ is the non-SI unit of magnetic flux.

Ans ✗ 1. Henry

✗ 2. Tesla

✗ 3. Weber

✔ 4. Maxwell

Q.13 Find voltage 'V_o' in the following circuit.

Ans ✗ 1. 15 V

✔ 2. 20 V

✗ 3. 10 V

✗ 4. 30 V

Q.14 Generally, motor life doubles for each _____ reduction in the operating temperature.

Ans ✗ 1. 40°C
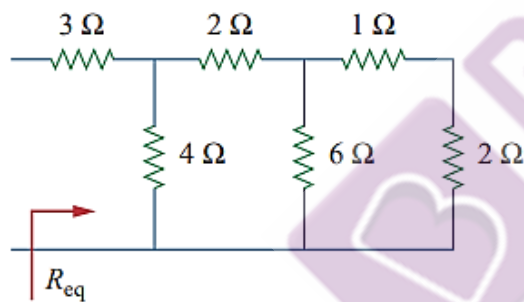
✓ 2. 10°C

✗ 3. 20°C

✗ 4. 30°C

Question ID : **630680197963**
Status : **Not Answered**
Chosen Option : **--**

Q.15 The shunt resistance used to extend the range in PMMC is usually made up of _____.

Ans ✗ 1. aluminium

✗ 2. platinum

✗ 3. carbon

✓ 4. manganin

Question ID : **630680197953**
Status : **Not Answered**
Chosen Option : **--**

Q.16 Find R_{eq} in the following circuit.

Ans ✗ 1. 3 Ω

✓ 2. 5 Ω

✗ 3. 7 Ω

✗ 4. 18 Ω

Question ID : **630680197943**
Status : **Answered**
Chosen Option : **2**

Q.17 Which of the following is NOT an effect of hunting in synchronous motors?
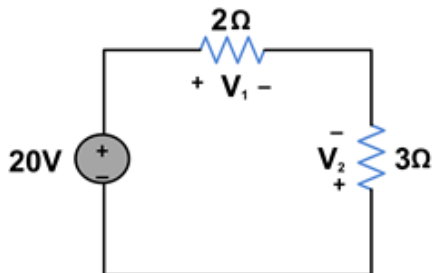
Ans ✗ 1. Increase in machine losses

✗ 2. Loss of synchronism

✗ 3. Increase in the machine temperature

✓ 4. Reduction in mechanical stress on the rotor shaft

Q.18 For the following circuit, find the voltage drop across 2 Ω.

Ans ✗ 1. 6 V

✓ 2. 8 V

✗ 3. 12 V

✗ 4. 4 V

Q.19 _____ are the devices that are used to detect the ground fault for ungrounded A.C. systems.

Ans ✓ 1. Ground detectors

✗ 2. Spark detectors

✗ 3. Phase detectors

✗ 4. Line detectors
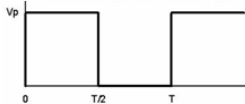
Q.20 For which of the following conditions does an induction machine act as an electric break?

Ans ✗ 1. Slip is negative

✗ 2. Slip is positive and less than 1

✓ 3. Slip is positive and greater than 1

✗ 4. Slip is zero

Q.21 Find the average value of the square wave signal shown in the following diagram, if given that $V_p = 100$ V.

Ans ✓ 1. 50 V

✗ 2. 86.6 V

✗ 3. 70.7 V

✗ 4. 63.7 V

Q.22 A series RLC circuit has R = 2 Ω, L = 0.025 H and C = 10 μF. Find the Q-factor.

Ans ✗ 1. 30

✗ 2. 50

✓ 3. 25

✗ 4. 45

Q.23 A series RL circuit is supplied through a 100 V, 50 Hz supply. If the RMS current in the circuit is 3 A, then find the apparent power in the circuit.

Ans ✗ 1. 424 VA

✗ 2. 150 VA

✗ 3. 212 VA

✓ 4. 300 VA

Q.24 A sinusoidal voltage is expressed as v(t) = 120 sin 314t. The peak-to-peak voltage for the same is _____.

Ans ✔ 1. 240 V

✘ 2. $120\sqrt{2}$ V

✘ 3. 120 V

✘ 4. $240\sqrt{2}$ V

Question ID : **630680197949**
Status : **Not Answered**
Chosen Option : **--**

Q.25 The resistance of a metal strip having rectangular cross-section of 2.5 cm × 0.05 cm and resistivity of 1.25×10^{-8} Ω.m is 10 Ω. Find the length of the conductor.

Ans ✔ 1. 10 km

✘ 2. 100 m

✘ 3. 10 m

✘ 4. 1 km

Question ID : **630680197939**
Status : **Answered**
Chosen Option : **1**

Q.26 Which of the following single-phase motors is mostly used in toys?

Ans ✘ 1. Permanent-split capacitor motor

✔ 2. Shaded-pole induction motor

✘ 3. Capacitor-start capacitor-run motor

✘ 4. Capacitor-start induction motor

Question ID : **630680197966**
Status : **Not Answered**
Chosen Option : **--**

Q.27 A three-phase induction motor is supplied through a 50 Hz supply. Find the frequency of the rotor current for 4% slip.

Ans ✘ 1. 5 Hz

✘ 2. 10 Hz

✔ 3. 2 Hz

✘ 4. 2.5 Hz

Question ID : **630680197965**
Status : **Answered**
Chosen Option : **4**

Q.28 In a string of suspension insulators, the disc nearest to the conductor has _____ voltage across it.

Ans
✗ 1. minimum
✗ 2. zero
✗ 3. moderate
✔ 4. maximum

Question ID : **630680197959**
Status : **Answered**
Chosen Option : **1**

Q.29 Three resistors, each one of value 3.3 kΩ, are connected in star connection. If star to delta transformation is performed, the value of each resistor in delta connection will be _____.

Ans
✔ 1. 9.9 kΩ
✗ 2. 1.1 kΩ
✗ 3. 3.3 kΩ
✗ 4. 6.6 kΩ

Question ID : **630680197942**
Status : **Answered**
Chosen Option : **1**

Q.30 A voltage source of v = 20 sin πt volts is connected across a 5 Ω resistor. Find the power dissipated in the resistor.

Ans
✗ 1. $60 \sin^2 \pi t$
✗ 2. $40 \sin^2 \pi t$
✗ 3. $100 \sin^2 \pi t$
✔ 4. $80 \sin^2 \pi t$

Question ID : **630680197937**
Status : **Answered**
Chosen Option : **4**

Q.31 In case of S.L. type screened cables, S.L. stands for _____

Ans
✗ 1. Service Lead
✔ 2. Separate Lead
✗ 3. Selective Lead
✗ 4. Shorted Lead

Question ID : **630680197956**
Status : **Not Answered**
Chosen Option : **--**

Q.32 With reference to corona, identify whether the following statements are true or false.

1) As compared to the solid conductor, the stranded conductor has more corona effect.
2) If the spacing between the conductors is very large, corona effect will be severe.

Ans ✗ 1. 1) False, 2) True

✗ 2. 1) True, 2) True

✓ 3. 1) True, 2) False

✗ 4. 1) False, 2) False

Q.33 What will be the frequency of the generated EMF if a 12-pole alternator runs at a speed of 600 rpm?

Ans ✗ 1. 30 Hz

✗ 2. 25 Hz

✓ 3. 60 Hz

✗ 4. 50 Hz

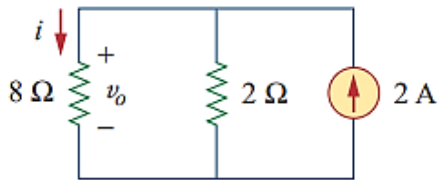**Q.34** In a three-phase alternator, if fundamental frequency is 50 Hz, the 3rd and the 5th harmonic frequencies will be _____ and _____, respectively.

Ans ✗ 1. 300 Hz; 500 Hz

✓ 2. 150 Hz; 250 Hz

✗ 3. 250 Hz; 150 Hz

✗ 4. 100 Hz; 200 Hz

Q.35 Find current 'i' in the following circuit.

Ans ✗ 1. 0.8 A

✗ 2. 1.0 A

✗ 3. 2.0 A

✓ 4. 0.4 A

Q.36 Which of the following methods is NOT used for calculations of medium transmission lines?

Ans ✗ 1. End condenser method

✓ 2. Rigorous method

✗ 3. Nominal-π method

✗ 4. Nominal-T method

Q.37 In transmission lines, the voltage regulation is negative, only if:

Ans ✗ 1. Load P.F. is leading such that $(I\,R\cos\Phi_R) > (I\,X_L\sin\Phi_R)$

✗ 2. Load P.F. is lagging

✗ 3. Load P.F. is unity

✓ 4. Load P.F. is leading such that $(I\,R\cos\Phi_R) < (I\,X_L\sin\Phi_R)$

Q.38 In the following diagram, if currents $I_1 = I_2 = 6$ A and $I_3 = I_4 = I_5$, then find I_3.
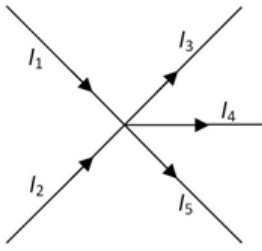
Ans

  ✗ 1. 6 A

  ✗ 2. 5 A

  ✗ 3. 12 A

  ✔ 4. 4 A

Q.39 Identify whether the following statements related to DC machines are true or false.

  1) Interpoles are also called compoles.

  2) The interpole windings are connected in series with the armature.

Ans

  ✗ 1. 1) False, 2) True

  ✔ 2. 1) True, 2) True

 ✗ 3. 1) False, 2) False

  ✗ 4. 1) True, 2) False

Q.40 Oil-filled cables can be used from _____ up to _____.

Ans

  ✔ 1. 66 kV; 230 kV

  ✗ 2. 22 kV; 33 kV

  ✗ 3. 11 kV; 22 kV

  ✗ 4. 33 kV; 66 kV

Section : **Domain Questions (Mechanical)**

Q.1 When the pressure is uniformly distributed over the entire area of the friction face of a plate clutch as shown in the following figure, the total frictional torque developed is:

(W is the axial thrust, $R = \left[\frac{r_1^3 - r_2^3}{r_1^2 - r_2^2}\right]$ and μ is the coefficient of friction)
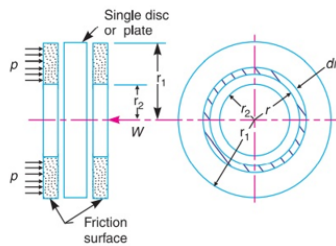
Ans

✗ 1. $\frac{3}{2}\mu WR$

✗ 2. $\frac{1}{2}\mu WR$

✔ 3. $\frac{2}{3}\mu WR$

✗ 4. μWR

Question ID : **630680198011**
Status : **Answered**
Chosen Option : **3**

Q.2 _____ is an example of the second inversion of a double slider-crank chain mechanism.

Ans

✗ 1. Whitworth quick-return motion mechanism

✗ 2. Rotary internal combustion engine

✔ 3. Scotch yoke

✗ 4. Crank and slotted lever quick-return motion mechanism

Question ID : **630680198008**
Status : **Answered**
Chosen Option : **3**

Q.3 The ratio of the difference between the maximum speed and the minimum speed to the mean speed for a governor is known as _____.

Ans

✔ 1. sensitiveness of the governor

✗ 2. efficiency of the governor

✗ 3. effort of the governor

✗ 4. power of the governor

Question ID : **630680198014**
Status : **Answered**
Chosen Option : **1**

Q.4 Identify whether the following statements about flywheel are correct or incorrect.

Statement A: It absorbs mechanical energy by decreasing its angular velocity.

Statement B: It is used to smooth out the flow of energy between a power source and its load.

Ans ✗ 1. Both Statement A and Statement B are incorrect.

✗ 2. Both Statement A and Statement B are correct.

✗ 3. Statement A is correct, but Statement B is incorrect.

✔ 4. Statement A is incorrect, but Statement B is correct.

<div style="border:1px solid #000; padding:8px; text-align:center;">
Question ID : 630680198009
Status : Answered
Chosen Option : 4
</div>

Q.5 Identify whether the following statements are correct or incorrect.

Statement A: A reversible adiabatic process is necessarily isentropic.

Statement B: An isentropic process is not necessarily a reversible adiabatic process.

Ans ✗ 1. Statement A is correct, but Statement B is incorrect.

✗ 2. Both Statement A and Statement B are incorrect.

✗ 3. Statement A is incorrect, but Statement B is correct.

✔ 4. Both Statement A and Statement B are correct.

<div style="border:1px solid #000; padding:8px; text-align:center;">
Question ID : 630680197987
Status : Answered
Chosen Option : 4
</div>

Q.6 _____ is the relation between Young's modulus of rigidity (E), modulus of rigidity (G) and bulk modulus of elasticity (K).

Ans ✗ 1. $\dfrac{1}{E} = \dfrac{3}{G} + \dfrac{1}{3K}$

✔ 2. $\dfrac{3}{E} = \dfrac{1}{G} + \dfrac{1}{3K}$

✗ 3. $\dfrac{3}{E} = \dfrac{1}{3G} + \dfrac{1}{K}$

✗ 4. $\dfrac{1}{E} = \dfrac{1}{3G} + \dfrac{3}{K}$

<div style="border:1px solid #000; padding:8px; text-align:center;">
Question ID : 630680198000
Status : Answered
Chosen Option : 2
</div>

Q.7 In a wind-tunnel model test shown in the following figure, at which region (represented by points A, B, C and D) is Bernoulli's equation valid?
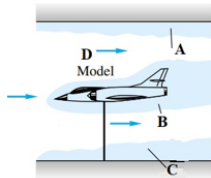
Ans ✗ 1. A

✗ 2. B

✗ 3. C

✔ 4. D

Q.8 Which of the following options is correct as an advantage of air-cooled IC engines?

Ans ✗ 1.
Air-cooled IC engines have little clearances between their various parts.

✗ 2. Air-cooled IC engines create less noise.

✗ 3. The volumetric efficiency is high.

✔ 4.
Due to small thermal losses, the specific fuel consumption is low.

Q.9 Friction factor in circular pipes depends on the _____.

Ans ✗ 1. pressure head

✗ 2. length of the pipe

✔ 3. Reynolds number

✗ 4. datum head

Q.10 The relation between average velocity (u_{avg}) and maximum velocity (u_{max}) for fully developed laminar flow in a circular pipe is given by:

Ans

✖ 1. $u_{max} = \dfrac{1}{2} u_{avg}$

✖ 2. $u_{max} = \dfrac{3}{2} u_{avg}$

✖ 3. $u_{avg} = \dfrac{3}{2} u_{max}$

✔ 4. $u_{avg} = \dfrac{1}{2} u_{max}$

Q.11 For a gear, the difference between the space width and the tooth thickness along the pitch circle is known as _____ .

Ans

✖ 1. face width
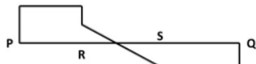
✖ 2. space width

✖ 3. working depth of teeth

✔ 4. backlash

Q.12 The shear force diagram of a simply supported beam is shown in the following figure. The beam is supported at P and Q. Identify whether the following statements are correct or incorrect.

Statement A: There is a concentrated load at S.

Statement B: There is a uniformly distributed load between R and S.

Ans

✖ 1. Both Statement A and Statement B are correct.

✔ 2. Statement A is incorrect, but Statement B is correct.

✖ 3. Statement A is correct, but Statement B is incorrect.

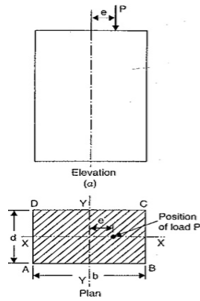✖ 4. Both Statement A and Statement B are incorrect.

Q.13 The ratio of the maximum stress to the minimum stress of a rectangular section subjected to an eccentric load as shown in the following figure is _____.

Elevation
(a)

Plan

Ans

✗ 1. $\dfrac{\left(1+\dfrac{e}{6.b}\right)}{\left(1-\dfrac{e}{6.b}\right)}$

✔ 2. $\dfrac{\left(1+\dfrac{6.e}{b}\right)}{\left(1-\dfrac{6.e}{b}\right)}$

✗ 3. $\dfrac{\left(1-\dfrac{e}{6.b}\right)}{\left(1+\dfrac{e}{6.b}\right)}$

✗ 4. $\dfrac{\left(1-\dfrac{6.e}{b}\right)}{\left(1+\dfrac{6.e}{b}\right)}$

Question ID : **630680198004**
Status : **Answered**
Chosen Option : **2**

Q.14 Work done by an ideal gas contained in the cylinder piston assembly, as between states 1 and 2 system undergoing a reversible adiabatic process, is _____ (where P, v are pressure and volume, γ represents the ratio of specific heats at constant pressure and constant volume and subscripts 1 and 2 represent the state of system).

Ans

✗ 1. $\dfrac{P_2v_2 - P_1v_1}{\gamma - 1}$

✗ 2. $\dfrac{P_2v_2 - P_1v_1}{(\gamma - 1)^2}$

✔ 3. $\dfrac{P_1v_1 - P_2v_2}{\gamma - 1}$

✗ 4. $\dfrac{P_1v_1 - P_2v_2}{(\gamma - 1)^2}$

Question ID : **630680197983**
Status : **Answered**
Chosen Option : **3**

Q.15 Consider a four-link mechanism shown in the following figure. The following statements **A** and **B** are related to necessary condition(s) for link '**a**' to be crank. Identify whether the two statements are correct or incorrect.

Statement A: The shortest link is '**d**'.

Statement B: The sum of the shortest link and the longest link is less than the sum of the other two links.
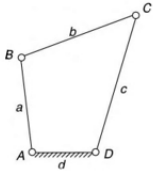
Ans

✗ 1. Statement A is correct, but Statement B is incorrect.

✗ 2. Both Statement A and Statement B are incorrect.

✗ 3. Statement A is incorrect, but Statement B is correct.

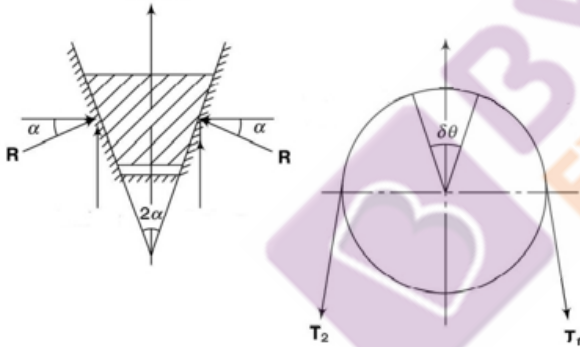✔ 4. Both Statement A and Statement B are correct.

Q.16 The ratio of tensions T_1 to T_2 in the V-belt shown in the following figure is:

(μ is the coefficient of friction between the belt and the pulley)

Ans

✔ 1. $e^{\mu\theta/\sin\alpha}$

✗ 2. $\log_e\left(\dfrac{\sin\alpha}{\mu\theta}\right)$

✗ 3. $\log_e\left(\dfrac{\mu\theta}{\sin\alpha}\right)$
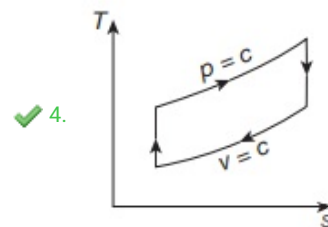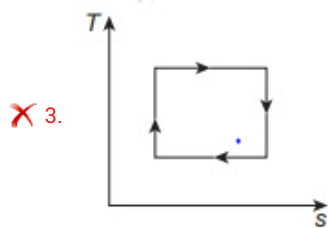
✗ 4. $e^{\sin\alpha/\mu\theta}$

Q.17 Which of the following represents T–s diagram of a diesel cycle?

Ans

✗ 1.

✗ 2.

✗ 3.
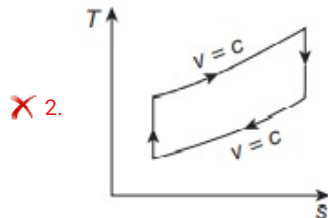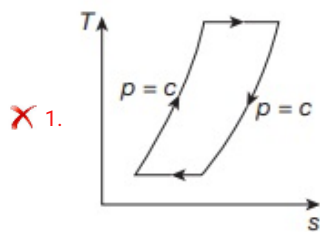
✔ 4.

Q.18 Modulus of resilience is defined as the:

Ans

✗ 1. total strain energy stored in a body

✗ 2. maximum strain energy stored in a body

✗ 3. capacity of a strained body to do work

✔ 4. proof of resilience of a material per unit volume

Q.19 A flow can be judged by the value of the Reynolds number (Re), which is represented as:

Ans

✓ 1. $Re = \dfrac{Inertia\,Force}{Viscous\,Force}$

✗ 2. $Re = \dfrac{Pressure\,Force}{Inertia\,Force}$

✗ 3. $Re = \dfrac{Inertia\,Force}{Pressure\,Force}$

✗ 4. $Re = \dfrac{Viscous\,Force}{Inertia\,Force}$

Q.20 A jet is entering and leaving a semi-circular plate tangentially. (Refer to the following figure.) The force

components, F_x and F_y, exerted by the jet are:

($\dot{m}$ is the mass flow rate, V is velocity of the jet, A is area of the plate and ρ is fluid density)
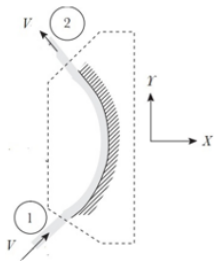
Ans

✗ 1. $F_x = 0,\ F_y = 2\dot{m}V$

✗ 2. $F_x = 0,\ F_y = \rho AV^2$

✓ 3. $F_x = 2\dot{m}V,\ F_y = 0$

✗ 4. $F_x = \rho AV^2,\ F_y = 0$

Q.21 The defect in casting in which very small holes uniformly dispersed throughout the casting are formed due to decrease in gas solubility during solidification is known as:

Ans

✓ 1. porosity

✗ 2. blister

✗ 3. gas holes

✗ 4. blow

Q.22 When the wear is uniform over the flat pivot bearing area, as shown in the following figure, the total frictional torque developed is:

(W is the load transmitted over the bearing area, R is the radius of the bearing surface and μ is the coefficient of friction)
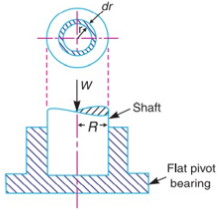
Ans

✗ 1. μWR

✔ 2. $\frac{1}{2}\mu WR$

✗ 3. $\frac{2}{3}\mu WR$

✗ 4. $\frac{3}{2}\mu WR$

Q.23 A dual cycle consists of two _____, _____ and _____ processes.

Ans

✗ 1. isentropic, isobaric heat addition, isochoric heat rejection

✗ 2. adiabatic, isobaric heat addition, isochoric heat rejection

✗ 3. adiabatic, isobaric heat addition, isochoric heat addition & rejection

✔ 4. isentropic, isobaric heat addition, isochoric heat addition & rejection

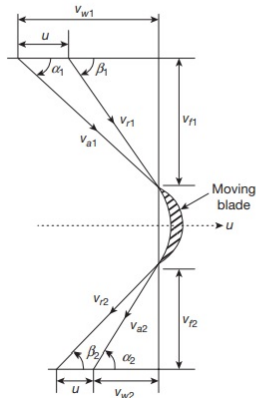**Q.24** For a steam turbine, if α_1 = angle that the absolute velocity of steam at the inlet makes with the plane of moving blades, or nozzle angle, or outlet angle of fixed blades and α_2 = angle that the absolute velocity of steam at the outlet makes with the plane of moving blades or inlet angle of fixed blades, then the maximum blade efficiency is equal to:

Ans

✔ 1. $\cos^2 \alpha_1$

✘ 2. $\sin^2 \alpha_2$

✘ 3. $\sin^2 \alpha_1$

✘ 4. $\cos^2 \alpha_2$

Q.25 Euler's crippling load for a column with one end fixed and another end hinged is _____ that of the crippling load for a column with both ends fixed.

Ans

✘ 1. two times

✘ 2. the same as

✘ 3. three times

✔ 4. half of

Q.26 The most commonly used ranges (in percentage) of sand, clay, water and additives in a green sand mould are _____, respectively.

Ans

✘ 1. 60–70, 20–30, 1–10 and 1–3

✘ 2. 50–65, 30–40, 5–10 and 5–10

✘ 3. 55–70, 20–35, 3–8 and 4–8

✔ 4. 70–85, 10–20, 3–6 and 1–6

Q.27 By which of the following figures is buckle, a casting defect, best represented?

Ans

✗ 1.

✗ 2.

✔ 3.

✗ 4.
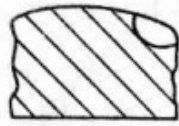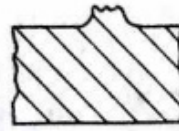
Question ID : **630680197994**
Status : **Not Answered**
Chosen Option : **--**

Q.28 _____ is the angle of twist of a circular shaft. (where T = Torque, ℓ = Length of the shaft, J = Polar moment of inertia, G = Modulus of rigidity)

Ans

✗ 1. $\dfrac{TJ}{G\ell}$

✗ 2. $\dfrac{GJ}{T\ell}$

✔ 3. $\dfrac{T\ell}{GJ}$

✗ 4. $\dfrac{TG}{J\ell}$

Question ID : **630680198006**
Status : **Answered**
Chosen Option : **3**

Q.29 Arc welding is an example of _____ welding process.

Ans

✗ 1. forge

✗ 2. resistance

✔ 3. fusion

✗ 4. friction

Question ID : **630680197995**
Status : **Answered**
Chosen Option : **3**

Q.30 In a typical sensitive drilling machine, a _____ provides the means of locating, holding and driving the cutting tools and obtains its drive through the pulley.

Ans

✗ 1. pillar

✔ 2. spindle

✗ 3. motor

✗ 4. hand wheel

Question ID : 630680197998
Status : **Answered**
Chosen Option : **2**

Q.31 Torque transmitted by a hollow circular shaft is given by _____ [where R_i (=D_i/2) & R_o (=D_o/2) are inner and outer radii, respectively, τ is shear stress and L is Length of shaft].

Ans

✗ 1. $\dfrac{\pi}{16}\tau\left(D_o^3 - D_i^3\right)$

✗ 2. $\dfrac{\pi}{16}\tau\left(R_o^3 - R_i^3\right)$

✔ 3. $\dfrac{\pi}{16}\tau\left(\dfrac{D_o^4 - D_i^4}{D_o}\right)$

✗ 4. $\dfrac{\pi}{16}\tau\left(\dfrac{R_o^4 - R_i^4}{R_o}\right)$

Question ID : 630680197999
Status : **Answered**
Chosen Option : **3**

Q.32 _____ is a beam which is extended beyond the support.

Ans

✗ 1. Fixed beam

✗ 2. Unstructured beam

✔ 3. Overhanging beam

✗ 4. Rigid beam

Question ID : 630680198002
Status : **Answered**
Chosen Option : **3**

Q.33 _____ is the ratio of the power available at the shaft to the power developed by the runner.

Ans

✓ 1. Mechanical efficiency

✗ 2. Thermal efficiency

✗ 3. Design efficiency

✗ 4. Ideal efficiency

Q.34 Of the finishing operations shown, which of the following best represents a lapping operation?

Ans

✗ 1.

✗ 2.

✓ 3.

✗ 4.
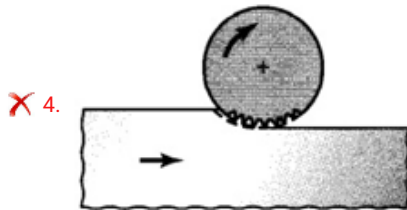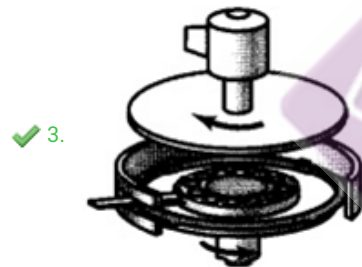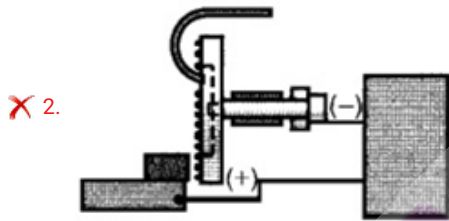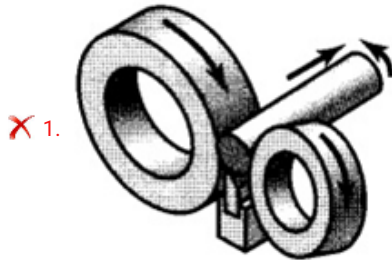
Q.35 Which of the welding defects shown in the following figures represents concavity?

Ans

✔ 1.

✘ 2.

✘ 3.

✘ 4.
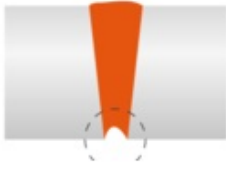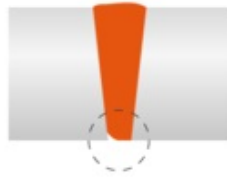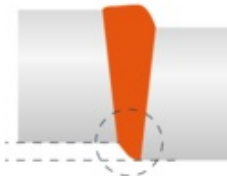
Q.36 Stream function, ψ, is defined for 2D incompressible flow in such a way that it satisfies _____.

Ans

✘ 1. Navier–Stokes equation

✘ 2. energy conservation principle

✔ 3. continuity equation

✘ 4. Bernoulli's equation

Q.37 A wooden pattern used in the casting process to generate surfaces of revolution in large castings and to prepare moulds out of a paste-like material is known as _____.

Ans

✘ 1. gated pattern

✘ 2. loose pattern

✘ 3. match plate pattern

✔ 4. sweep pattern

Q.38 Identify whether the following statements are correct or incorrect.

Statement A: A Carnot heat engine consists of two isentropic and two isothermal processes.

Statement B: The expression $\oint \delta W \leq 0$, is an outcome of the second law of thermodynamics.

Ans ✗ 1. Statement A is correct, but Statement B is incorrect.

✗ 2. Statement A is incorrect, but Statement B is correct.

✔ 3. Both Statement A and Statement B are correct.

✗ 4. Both Statement A and Statement B are incorrect.

Q.39 Which of the following is a Bernoulli-type obstruction flow measuring device?

Ans ✗ 1. Rotameter

✗ 2. Vortex meter

✗ 3. Coriolis mass flow meter

✔ 4. Venturi tube

Q.40 The ratio of the total volume to the clearance volume of a cylinder of a compression ignition engine is known as:

Ans ✗ 1. volumetric efficiency

✗ 2. cut-off ratio

✔ 3. compression ratio

✗ 4. air–fuel ratio

Section : **Reasoning**

Q.1 Select the figure from among the given options that can replace the question mark (?) in the following series.

Ans

✔ 1.

✘ 2.

✘ 3.

✘ 4.
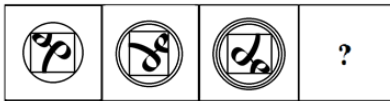
Q.2 Study the given diagram carefully and answer the question that follows. The numbers in different sections indicate the numbers of persons with different pet animals.
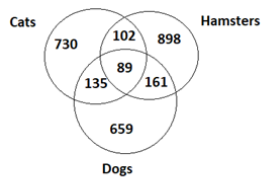
How many persons have both dogs and hamsters as pets?

Ans ✘ 1. 161

✘ 2. 89

✔ 3. 250

✘ 4. 190

Q.3 Select the correct water image of the given figure.

Ans

✗ 1.

✗ 2.

✔ 3.

✗ 4.
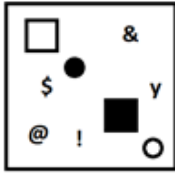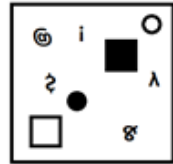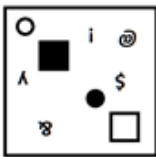
Question ID : **630680198021**
Status : **Answered**
Chosen Option : **3**

Q.4 Which two numbers should be interchanged to make the following equation correct?

$15 \times 5 \div 25 + 26 + 6 = 17$

Ans ✗ 1. 6 and 17

✗ 2. 5 and 25

✔ 3. 17 and 26

✗ 4. 5 and 15

Question ID : **630680198023**
Status : **Answered**
Chosen Option : **3**

Q.5 Select the number from among the given options that can replace the question mark (?) in the following series.

18, 20, 24, 32, 48, ?

Ans   ✓ 1. 80

   ✗ 2. 82

   ✗ 3. 78

   ✗ 4. 72

Question ID : **630680198022**
Status : **Answered**
Chosen Option : **1**

Q.6 Eight fishermen, Q, R, S, T, U, V, W and A, are sitting around a square table, facing the centre of the table. Some of them are sitting at the corners, while some are sitting at the exact centre of the sides. S, at a corner, is at the immediate left of W. Q is sitting third to the left of A. A and V are diagonally opposite to each other. R, at a corner, is sitting exactly between U and Q. Who is sitting at the immediate left of A?

Ans   ✗ 1. T

   ✓ 2. U

   ✗ 3. W

   ✗ 4. S

Question ID : **630680198015**
Status : **Answered**
Chosen Option : **2**

Q.7 If '+' means 'division', '−' means 'addition', '×' means 'subtraction' and '÷' means 'multiplication', what will be the value of the following expression?

[{(13 × 7) - (4 ÷ 4)} + (8 - 3)] ÷ 3

Ans   ✗ 1. 9

   ✗ 2. 1

   ✗ 3. 3

   ✓ 4. 6

Question ID : **630680198024**
Status : **Answered**
Chosen Option : **4**

Q.8 In a certain code language, 'DECENT' is coded as 'EGFISZ' and 'CAREER' is coded as 'DCUIJX'. How will 'CHOSEN' be coded in that language?

Ans   ✓ 1. DJRWJT

   ✗ 2. DJRWJU

   ✗ 3. DJRWKT

   ✗ 4. DJRVJT

Question ID : **630680198017**
Status : **Answered**
Chosen Option : **1**

Q.9 Select the option that is related to the third term in the same way as the second term is related to the first term.
(The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word.)

AMMETER : CURRENT :: ODOMETER : ?

Ans ✔️ 1. DISTANCE

❌ 2. WIND

❌ 3. STRAINS

❌ 4. THICKNESS

Q.10 If
'M ¥ N' means 'M is the brother of N',
'M € N' means 'M is the husband of N',
'M + N' means 'M is the mother of N',
'M λ N' means 'M is the sister of the husband of N' and
'M © N' means 'M is the wife of N',
then how is Q related to T in the following expression?
P ¥ Q € R + S λ T

Ans ❌ 1. Wife's father

✔️ 2. Husband's father

❌ 3. Brother

❌ 4. Father's mother

Section : **Quantitative Aptitude**

Q.1 A vendor sold an article at a loss of $5\frac{1}{2}\%$. If he had sold it for ₹92 more, he would gain 6%. To gain 10% he should sell it for ___ .

Ans ❌ 1. ₹865

✔️ 2. ₹880

❌ 3. ₹920

❌ 4. ₹905

Q.2 A 225 m long train crosses a man walking at a speed of 3.5 km/h in the opposite direction in 15 seconds. What is the distance travelled by train in 6 hours?

Ans

✗ 1. 312km

✗ 2. 328 km

✗ 3. 321 km

✔ 4. 303 km

Question ID : **630680198031**
Status : **Answered**
Chosen Option : **4**

Q.3 A car travels two-seventh of the distance at a speed of 50 km/h, half of the remaining distance at a speed of 60 km/h, and the remaining distance at a speed of 75 km/h. What is the average speed of the car for the whole journey? (correct to two decimal places)

Ans

✗ 1. 58.96 km/h

✗ 2. 59.75 km/h

✗ 3. 57.69 km/h

✔ 4. 60.87 km/h

Question ID : **630680198028**
Status : **Answered**
Chosen Option : **4**

Q.4 The largest five-digit number which is exactly divisible by 36, 42 and 65 is:

Ans

✗ 1. 99760

✔ 2. 98280

✗ 3. 98560

✗ 4. 99540

Question ID : **630680198026**
Status : **Answered**
Chosen Option : **2**

Q.5 If the GST be reduced from 7.0% to 6.25% on an electric cooker, what difference does it make to a person who purchases the electric cooker with the marked price of ₹7,360?

Ans

✗ 1. ₹58.50

✔ 2. ₹55.20

✗ 3. ₹59.40

✗ 4. ₹60.80

Question ID : **630680198029**
Status : **Answered**
Chosen Option : **2**

Q.6 If the average of 10 consecutive numbers is 13.5, then the average of the first two consecutive numbers is:

Ans
❌ 1. 10.5

❌ 2. 11.5

❌ 3. 8.5

✅ 4. 9.5

Q.7 The diagonal and one side of a rectangular plot are 130 m and 126 m, respectively. The perimeter of the rectangular plot is:

Ans
❌ 1. 256 m

✅ 2. 316 m

❌ 3. 284 m

❌ 4. 300 m

Q.8 A and B can complete a work in 14 days and 21 days, respectively. They started doing the work but after 4 days A had to leave and B alone completed the remaining work. In how many days was the whole work completed?

Ans
✅ 1. 15

❌ 2. 17

❌ 3. 20

❌ 4. 11

Q.9 Simplify the following expression.

$$\frac{\sqrt{1.21}+\sqrt{2.25}-\sqrt{2.89}}{\sqrt{2.56}-\sqrt{1.69}} = ?$$

Ans
❌ 1. 5

❌ 2. 6

✅ 3. 3

❌ 4. 4

Q.10 If the radius of a sphere is increased by 2cm, then its surface area increases by 1056 cm². The volume of the sphere increases by: (correct to three decimal places)

Ans
✔ 1. $11,096.381 \text{ cm}^3$

✘ 2. $12,051.112 \text{ cm}^3$

✘ 3. $10,095.564 \text{ cm}^3$

✘ 4. $10,255.253 \text{ cm}^3$

Question ID : **630680198034**
Status : **Not Answered**
Chosen Option : **--**

Section : **General Awareness**

Q.1 In which of the following years did Swami Vivekananda found Ramakrishna Mission?

Ans
✘ 1. 1885

✘ 2. 1890

✔ 3. 1897

✘ 4. 1889

Question ID : **630680198036**
Status : **Not Answered**
Chosen Option : **--**

Q.2 Who among the following is the fifth Indian woman to win a World Title at the Women's World Boxing Championships?

Ans
✘ 1. Mary Kom

✔ 2. Nikhat Zareen

✘ 3. Lovlina Borgohain

✘ 4. Pooja Rani

Question ID : **630680198044**
Status : **Answered**
Chosen Option : **2**

Q.3 Which of the following acids is also known as acetic acid?

Ans
✔ 1. Ethanoic acid

✘ 2. Sulphuric acid

✘ 3. Nitric acid

✘ 4. Formic acid

Question ID : **630680198041**
Status : **Not Answered**
Chosen Option : **--**

Q.4 **What is the yearly average temperature of tropical deciduous forests?**

Ans ✗ 1. 20° C

✗ 2. 25° C

✗ 3. 15° C

✓ 4. 10° C

Question ID : **630680198040**
Status : **Not Answered**
Chosen Option : **--**

Q.5 **Which of the following Articles of the Constitution of India talks about 'Prohibition of employment of children in factories'?**

Ans ✗ 1. Article 30

✗ 2. Article 29

✓ 3. Article 24

✗ 4. Article 23

Question ID : **630680198042**
Status : **Answered**
Chosen Option : **3**

Q.6 **Dubdi Monastery is situated in:**

Ans ✗ 1. Meghalaya

✗ 2. Tripura

✓ 3. Sikkim

✗ 4. Manipur

Question ID : **630680198037**
Status : **Not Answered**
Chosen Option : **--**

Q.7 **Who among the following governors has unveiled PARAM Shakti, a petascale supercomputer, at IIT Kharagpur?**

Ans ✗ 1. Ganga Prasad

✗ 2. RN Ravi

✗ 3. Gurmit Singh

✓ 4. Jagdeep Dhankhar

Question ID : **630680198035**
Status : **Answered**
Chosen Option : **4**

Q.8 In May 2022, an online platform called 'Trade nxt' was launched by:

Ans ✗ 1. Indian Bank

✗ 2. Axis Bank

✗ 3. Yes Bank

✓ 4. Union Bank of India

Question ID : **630680198039**
Status : **Answered**
Chosen Option : **4**

Q.9 Which of the following is NOT one of the five subjects that have been shifted from the State List to the Concurrent List as per the 42nd Amendment Act, 1976?

Ans ✗ 1. Education

✗ 2. Forests

✗ 3. Weights and measures

✓ 4. Marriage

Question ID : **630680198043**
Status : **Answered**
Chosen Option : **4**

Q.10 For how many districts across India has the digital banking been proposed by the Government in Union Budget 2022–23?

Ans ✗ 1. 90

✗ 2. 80

✓ 3. 75

✗ 4. 85

Question ID : **630680198038**
Status : **Not Answered**
Chosen Option : **--**

Section : **English Language**

Q.1 Select the most appropriate meaning of the given idiom.

Have your heart in your mouth

Ans ✗ 1. To be very sick

✗ 2. To have an unpleasant argument

✗ 3. To behave in a foolish manner

✓ 4. To be extremely frightened

Question ID : **630680198050**
Status : **Answered**
Chosen Option : **4**

Q.2 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the correct order to form a meaningful and coherent paragraph.

A. The bridge offers unusual views for visitors who have a head for heights.
B. In the Czech Republic, the world's longest pedestrian suspension bridge opened at a mountain resort.
C. The 721-meter-long bridge is at an altitude of more than 1100 metres above sea level and it connects two ridges of the mountains.
D. Up to 500 people can be on the bridge; however, if winds reach 135 kph, it'll close for safety reasons.

Ans ✗ 1. ACDB

✗ 2. CABD

✗ 3. BADC

✔ 4. BCAD

Q.3 Select the most appropriate option that can substitute the underlined words in the given sentence.

<u>An image</u> is worth a thousand words

Ans ✗ 1. an action

✔ 2. a picture

✗ 3. a painting

✗ 4. a movie

Q.4 Select the most appropriate synonym of the given word to fill in the blank.

EXPEDITE
The Managing Director of the company asked the manger to _____ the matter with the government so that the project can be started.

Ans ✗ 1. defer

✗ 2. assist

✔ 3. accelerate

✗ 4. retard

Q.5 Select the most appropriate option to fill in the blank.

They live on _____ opposite side of the road.

Ans ✗ 1. no word need

✗ 2. an

✔ 3. the

✗ 4. a

Question ID : **630680198045**
Status : **Answered**
Chosen Option : **3**

Q.6 Select the most appropriate option to fill in the blank.

The gull circled over the lake for a while. Then it _____ down majestically to catch a fish.

Ans ✗ 1. swoop

✗ 2. had swooped

✔ 3. swooped

✗ 4. swoops

Question ID : **630680198046**
Status : **Not Answered**
Chosen Option : **--**

Q.7 The following sentence has been divided into parts. One of them may contain an error. Select the part that contains the error from the given options. If you don't find any error, mark 'No error' as your answer.

The session will not be adjorned / until the Finance Minister / has presented the budget.

Ans ✗ 1. until the Finance Minister

✗ 2. has presented the budget.

✔ 3. The session will not be adjorned

✗ 4. no error

Question ID : **630680198048**
Status : **Answered**
Chosen Option : **2**

Comprehension:

Read the given passage and answer the questions that follow.

Kangra Miniature painting is one of the schools of Pahari paintings along with Guler, Basholi, Mandi, Chamba and Bilaspur. Miniatures are small-sized paintings, generally done in water colour on cloth or paper.
Painting in the Kangra region blossomed under the patronage of a remarkable ruler, Raja Sansar Chand (1775–1823). It is believed that when Prakash Chand of Guler came under grave financial crisis and could no longer maintain his atelier, his master artist, Manaku, and his sons took service under Sansar Chand of Kangra. Raja Sansar Chand established supremacy of Kangra over all surrounding hill states. Tira Sujanpur, his capital town on the banks of river Beas, emerged as the most prolific centre of painting under his patronage.
The Kangra style is by far the most poetic and lyrical of Indian styles marked with serene beauty and delicacy of execution. Characteristic features of the Kangra style are delicacy of line, brilliance of colour and minuteness of decorative details. Distinctive is the delineation of the female face, with straight nose in line with the forehead, which came in vogue around the 1790s is the most distinctive feature of this style.
Most popular themes that were painted were the Bhagvata Purana, Gita Govinda, Nala Damayanti and Bihari Satsai. Many other paintings comprise a pictorial record of Sansar Chand and his court. He is shown sitting by the riverside, listening to music, watching dancers, presiding over festivals, practising tent pegging and archery, drilling troops and so on and forth. Fattu, Purkhu and Khushala are important painters of the Kangra style.

SubQuestion No : 8

Q.8 **Which of the following was NOT a popular theme of Kangra school of paintings?**

Ans ✗ 1. Bihari Satsai

✓ 2. Bhagavad Gita

✗ 3. Bhagvata Purana

✗ 4. Gita Govinda

Comprehension:

Read the given passage and answer the questions that follow.

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SubQuestion No : 9

Q.9 The theme of the passage revolves around:

Ans   ✗ 1. Pahari style of painting

✗ 2. Raja Sansar Chand of Kangra

✔ 3. Kangra style of painting

✗ 4. themes of paintings in 1790s

Question ID : **630680198053**
Status : **Answered**
Chosen Option : **3**

Comprehension:

Read the given passage and answer the questions that follow.

Kangra Miniature painting is one of the schools of Pahari paintings along with Guler, Basholi, Mandi, Chamba and Bilaspur. Miniatures are small-sized paintings, generally done in water colour on cloth or paper.

Painting in the Kangra region blossomed under the patronage of a remarkable ruler, Raja Sansar Chand (1775–1823). It is believed that when Prakash Chand of Guler came under grave financial crisis and could no longer maintain his atelier, his master artist, Manaku, and his sons took service under Sansar Chand of Kangra. Raja Sansar Chand established supremacy of Kangra over all surrounding hill states. Tira Sujanpur, his capital town on the banks of river Beas, emerged as the most prolific centre of painting under his patronage.

The Kangra style is by far the most poetic and lyrical of Indian styles marked with serene beauty and delicacy of execution. Characteristic features of the Kangra style are delicacy of line, brilliance of colour and minuteness of decorative details. Distinctive is the delineation of the female face, with straight nose in line with the forehead, which came in vogue around the 1790s is the most distinctive feature of this style.

Most popular themes that were painted were the Bhagvata Purana, Gita Govinda, Nala Damayanti and Bihari Satsai. Many other paintings comprise a pictorial record of Sansar Chand and his court. He is shown sitting by the riverside, listening to music, watching dancers, presiding over festivals, practising tent pegging and archery, drilling troops and so on and so forth. Fattu, Purkhu and Khushala are important painters of the Kangra style.

SubQuestion No : 10

Q.10 **Which of the following statements are true?**

A. Tira Sujanpur was the most prolific centre of painting under the patronage of Raja Sansar Chand.
B. Sansar Chand and his court formed one of the popular subjects of Kangra paintings.
C Kangra paintings are known for their subdued colours and delineation of courtiers' faces.

Ans ✗ 1. A and C are true

✗ 2. B and C are true

✔ 3. A and B are true

✗ 4. A, B and C all are true