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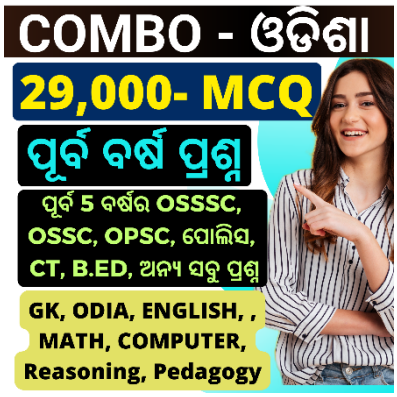

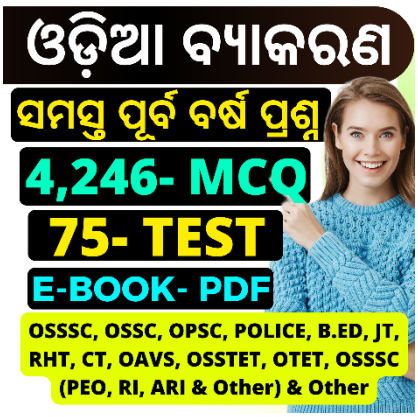

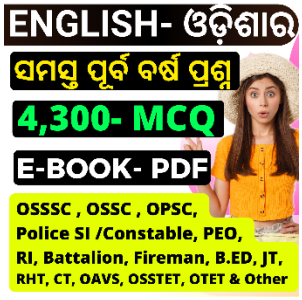

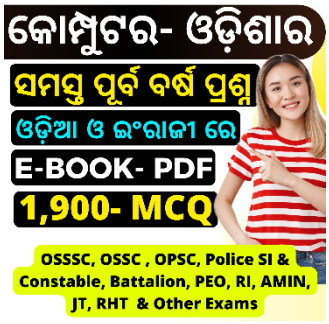

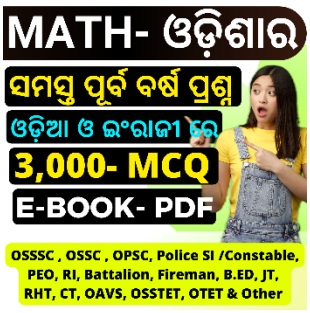

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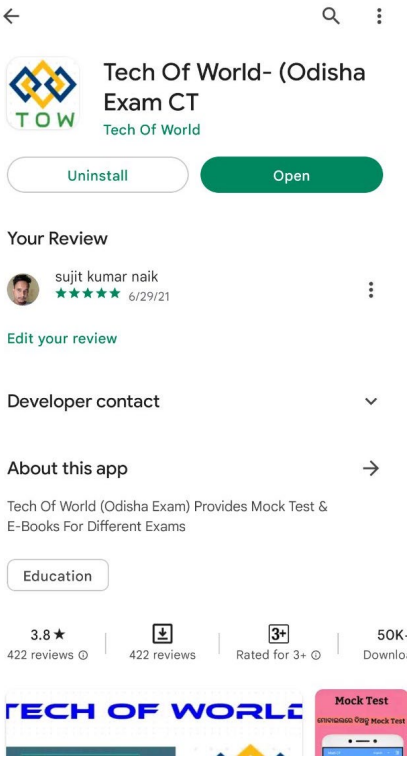

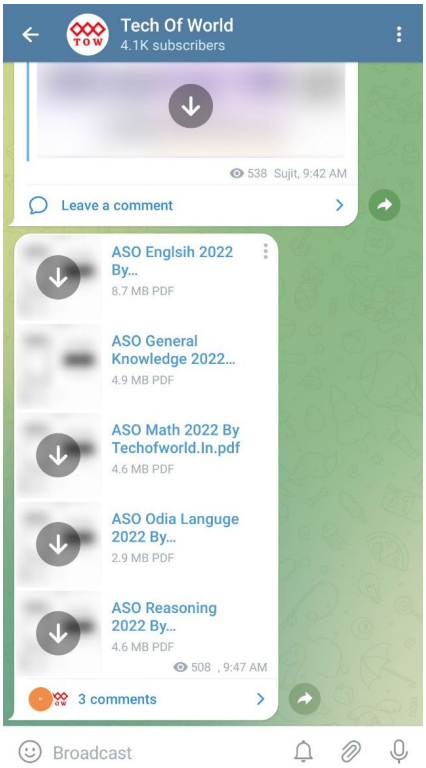

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OSSC Main Written Examination for Regular Teacher 25th Sep 2023 S1
Tentative Score

Participant ID	[redacted]
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Test Date	25/09/2023
Test Time	8:30 AM - 10:30 AM
Subject	TGT Science PCM
Marks Obtained	[redacted]

Section : **Pedagogy**

Q.1 **Which of the following is NOT a characteristic of constructivist approach to learning?**

Ans
- ✗ A. Major focus is on learning rather than on teaching.
- ✗ B. New learning is built on old personal experiences.
- ✗ C. It is based on the principle of 'learning by doing'.
- ✓ D. Teacher has a dominant role in the whole process.

Question Type : **MCQ**
Question ID : **4906395553**
Option 1 ID : **49063922210**
Option 2 ID : **49063922212**
Option 3 ID : **49063922211**
Option 4 ID : **49063922209**
Status : **Not Answered**
Chosen Option : **--**
Marks : **0**

Q.2 **A systematic and organised collection of learners previous work done by him over a specified period is known as:**

Ans
- ✗ A. Cumulative record
- ✗ B. Transcript
- ✗ C. Dissertation
- ✓ D. Portfolio

Q.3 If different evaluators, who evaluate a student's performance on a test, agree on the score awarded to it, then the test is said to be:

Ans
- ✗ A. Dependable
- ✗ B. Reliable
- ✗ C. Valid
- ✓ D. Objective

Q.4 Teaching is best defined as a process of:

Ans
- ✗ A. Preparing learners to score high marks.
- ✗ B. Training learners for gainful employment.
- ✓ C. Purposeful teacher-learner Interaction.
- ✗ D. Flow of information from teacher to learners.

Q.5 Which of the following types of counselling strategy was proposed by Karl Rogers?

Ans
- ✗ A. Individual counselling
- ✗ B. Group counselling
- ✗ C. Directive counselling
- ✓ D. Non-directive counselling

Q.6 The main purpose of continuous and comprehensive evaluation is to assess:

Ans
- ✗ A. Product of learning.
- ✗ B. What students learn.
- ✗ C. How students learn.
- ✓ D. Progress of learning.

Q.7 When the work of a person is assessed by another member of his own group, the process is known as:

Ans
- ✗ A. Portfolio assessment
- ✗ B. Internal assessment
- ✗ C. Placement assessment
- ✓ D. Peer-assessment

Q.8 A competitive test conducted for selection of candidates for a course in technical education is an:

Ans
- ✗ A. Assessment as learning
- ✗ B. Assessment after learning
- ✓ C. Assessment for learning
- ✗ D. Assessment of learning

Q.9 Learning is effective when it is based on:

Ans
- ✗ A. Drill exercises.
- ✓ B. Previous knowledge.
- ✗ C. Textbook reading.
- ✗ D. Teacher's command.

Q.10 An achievement test is conducted:

Ans
- ✗ A. As and when teacher wishes.
- ✗ B. Before teaching work begins.
- ✗ C. During the process of teaching.
- ✓ D. After the teaching work is over.

Q.11 The biggest challenge before a classroom teacher is to:

Ans
- ✗ A. Display instructional material effectively.
- ✓ B. Make learning process enjoyable for students.
- ✗ C. Ensure pin-drop silence to avoid disturbance.
- ✗ D. Maintain proper discipline in the classroom.

Q.12 The main purpose of teacher-made tests is to:

Ans
- ✗ A. Promote students to next higher grade.
- ✗ B. Test students' learning ability.
- ✗ C. Inform parents of progress of their children.
- ✓ D. Monitor achievement of educational objectives.

Q.13 Which of the following is an advantage of lecture method of teaching?

Ans
- ✗ A. No scope for discussion and debate among learners
- ✗ B. It imparts information without ensuring understanding.
- ✗ C. The thought process of learners is not activated.
- ✓ D. Large audience may be served with limited resources.

Q.14 A classroom teacher administered an achievement test to a group of students twice, and computed correlation coefficient between the two sets of scores. The teacher is interested in:

Ans
- ✗ A. Objectivity of the test.
- ✓ B. Reliability of the test.
- ✗ C. Validity of the test.
- ✗ D. Efficiency of the test.

Q.15 Which of the following statements reflects constructive pedagogy?

Ans
- ✗ A. Students read books and memorize the contents.
- ✓ B. Students discuss various points and clarify issues.
- ✗ C. Students listen to what teacher says and note down.
- ✗ D. Teacher asks the learners to follow what he does.

Q.16 Which of the following factors play the most significant role in influencing learnin process?

Ans
- ✗ A. Learner's socioeconomic background
- ✓ B. Learner's Experience with environment
- ✗ C. Continuous reinforcement by the teacher
- ✗ D. Learner's communication skills

Q.17 Which of the following serves the same purpose as 'assessment for learning?

Ans
- ✗ A. Placement test
- ✗ B. Aptitude test
- ✗ C. Selection test
- ✓ D. Diagnostic test

Q.18 Which of the following statements is NOT true for learning as a process?

Ans
✗ A. It requires personal involvement.
✓ B. It is not related to maturation.
✗ C. It takes place under certain conditions.
✗ D. It is effective under high level of motivation.

Q.19 A major characteristic of learner-centric approach of teaching is that:

Ans
✗ A. Participation of learners is not a concern.
✓ B. Learners are free to construct their own knowledge.
✗ C. Teacher is considered as a main source of knowledge.
✗ D. Major emphasis is on completion of syllabus.

Q.20 If test has a certain degree of reliability, it means that:

Ans
✓ A. It may or may not be valid for intended purpose.
✗ B. It must be valid for intended purpose.
✗ C. It is not valid for intended purpose.
✗ D. It has certain degree of validity.

Q.21 A ball is thrown vertically upwards with a velocity of 20 m/s from the top of a multi-storeyed building. The height of the point from where the ball is thrown is 25.0 m from the ground. (Take g = 10 m/s^2). How long will it be before the ball hits the ground?

Ans

✗ A. 6 s

✗ B. 7 s

✗ C. 8 s

✓ D. 5 s

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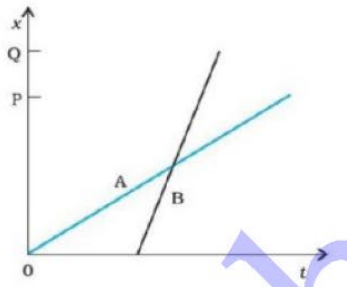
Q.22 The position-time (x-t) graphs for two children A and B returning from their school O to their homes P and Q respectively are shown in the figure below. Choose the correct entry from the below options:



Ans

✗ A. B starts from the school earlier than A

✗ B. B lives closer to the school than A

✓ C. B walks faster than A

✗ D. A overtakes B on the road once

Q.23 An insect trapped in a circular groove of radius 12 cm moves along the groove steadily and completes 7 revolutions in 100 s. What is the angular speed ?

Ans

✔ A. 0.44 rad/s

✘ B. 0.36 rad/s

✘ C. 0.72 rad/s

✘ D. 0.60 rad/s

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Q.24 A bullet of mass 0.04 kg moving with a speed of 90 m s^{-1} enters a heavy wooden block and is stopped after a distance of 60 cm. What is the average resistive force exerted by the block on the bullet?

Ans

✔ A. 270 N

✘ B. 280 N

✘ C. 300 N

✘ D. 360 N

Q.25 A batsman hits back a ball straight in the direction of the bowler without changing its initial speed of 12 ms^{-1}. If the mass of the ball is 0.15 kg, determine the impulse imparted to the ball. (Assume linear motion of the ball)

Ans

✗ A. 2.4 N s

✗ B. 4.8 N s

✗ C. 1.8 N s

✓ D. 3.6 N s

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Q.26 Determine the maximum acceleration of the train in which a box lying on its floor will remain stationary, given that the co-efficient of static friction between the box and the train's floor is 0.15.

Ans

✗ A. 2.5 m/s^2

✗ B. 4 m/s^2

✓ C. 1.5 m/s^2

✗ D. 5 m/s^2

Q.27 A cyclist comes to a skidding stop in 10 m. During this process, the force on the cycle due to the road is 200 N and is directly opposed to the motion. How much work does the cycle do on the road?

Ans

✔ A. Zero

✘ B. -2500 J

✘ C. +2500 J

✘ D. +2000 J

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Q.28 In a ballistics demonstration a police officer fires a bullet of mass 50.0 g with speed 200 m s^{-1} on soft plywood of thickness 2.00 cm. The bullet emerges with only 10% of its initial kinetic energy. Then what would be the approximate percentage reduction in speed?

Ans

✔ A. 68 %

✘ B. 32 %

✘ C. 90 %

✘ D. 10%

Q.29 The angular speed of a motor wheel is increased from 1200 rpm to 3120 rpm in 16 seconds. How many revolutions does the engine make during this time?

Ans

✗ A. 657

✗ B. 600

✓ C. 576

✗ D. 765

Q.30 A 400 kg satellite is in a circular orbit of radius $2R_E$ about the Earth. How much energy is required to transfer it to a circular orbit of radius $4R_E$?

Ans

✗ A. 6.26×10^9 J

✗ B. 5.25×10^9 J

✓ C. 3.13×10^9 J

✗ D. 5.25×10^8 J

Q.31 A structural steel rod has a radius of 10 mm and a length of 1.0 m. A 100 kN force stretches it along its length. Young's modulus, of structural steel is 2.0×10^{11} N/m^2.Calculate Stress =?

Ans

✗ A. 6.36×10^8 N / m^2

✗ B. 8.68×10^8 N / m^2

✗ C. 5.28×10^8 N / m^2

✓ D. 3.18×10^8 N / m^2

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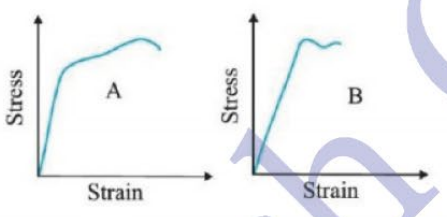
Q.32 The stress-strain graphs for materials *A* and *B* are shown in the figure below. Which of the following statements can be certainly inferred from the figure?



Ans

✓ A. Material A is stronger than B

✗ B. Young's modulus of B is greater than A

✗ C. None of these

✗ D. Material B is stronger than A

Q.33 If atmospheric pressure is 1.01 X 10^5 Pa, and density of water is 1000 Kg/m^3, Then, what is the approximate pressure on a swimmer 10 m below the surface of a lake? (g = 10 m/s^2)

Ans

✔ A. 2 atm

✗ B. 4 atm

✗ C. 3 atm

✗ D. 1 atm

Question
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Q.34 Given :[*The density of sea water is 1.03 × 10^3 kg/m^3, atmospheric pressure is 1.01 X 10^5 Pa, g = 10 m/s^2*]
Then, at a depth of 1000 m in an ocean, Find the force acting on the window of area 20 cm × 20 cm of a submarine at this depth, the interior of which is maintained at sea level atmospheric pressure?

Ans

✔ A. 4.12×10^5 N

✗ B. 2.06×10^5 N

✗ C. 1.03×10^5 N

✗ D. 8.24×10^5 N

Q.35 In a car lift compressed air exerts a force F_1 on a small piston having a radius of 5.0 cm. This pressure is transmitted to a second piston of radius 15 cm. If the mass of the car to be lifted is 1350 kg (g = 9.8 m/s^2). What is the pressure necessary on the small piston to accomplish this task?

Ans

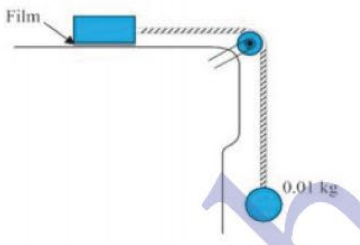
✗ A. 2.5×10^5 Pa

✓ B. 1.9×10^5 Pa

✗ C. 3.5×10^3 Pa

✗ D. 3.5×10^5 Pa

Q.36 A metal block of area 0.10 m^2 is connected to a 0.010 kg mass via a string that passes over an ideal pulley (considered massless and frictionless), as in Figure below. A liquid with a film thickness of 0.30 mm is placed between the block and the table. When released the block moves to the right with a constant speed of 0.085 m/s. Find the coefficient of viscosity of the liquid? (g = 9.8 m/s^2)



Ans

✗ A. 4.86×10^{-3} Pa s

✗ B. 1.86×10^{-3} Pa s

✗ C. 1.5×10^{-3} Pa s

✓ D. 3.46×10^{-3} Pa s

Q.37 The terminal velocity of a copper ball of radius 2.0 mm falling through a tank of oil at 20°C is 6.5 cm/s. Compute the viscosity of the oil at 20°C. [Density of oil is 1.5×10^3 kg/m^3, density of copper is 8.9×10^3 kg/m^3]

Ans

✔ A. 0.99 kg /ms

✘ B. 7.99 kg /ms

✘ C. 8.99 kg /ms

✘ D. 6.99 kg /ms

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Q.38 A flask contains argon and chlorine in the ratio of 2:1 by mass. The temperature of the mixture is 27 °C. Atomic mass of argon = 39.9 u; Molecular mass of chlorine = 70.9 u. Obtain the ratio of root mean square speed v_{rms} of the molecules of the two gases Argon and Chlorine:

Ans

✘ A. 2:3

✘ B. 1:3

✘ C. 1:1

✔ D. 4:3

Q.39 Which of the following functions of time and their periodicity of motion is correctly matched? [ω is any positive constant].

1	sin ω*t* + cos ω*t*	Non-periodic
2	sin ω*t* + cos 2 ω*t* + sin 4 ω*t*	Periodic
3	$e^{-\omega t}$	Non-periodic
4	log (ω*t*)	Periodic

Ans

✔ A. 2 & 3 only

✘ B. 2 only

✘ C. All of the above

✘ D. 1 & 3 only

Question
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Q.40 A body oscillates with Simple Harmonic Motion according to the equation (in SI units),
$x = 5 \cos [2\pi t + \pi/4]$.
At $t = 1.5$ s, Calculate the acceleration of the body?

Ans

✔ A. 140 m s^{-2}

✘ B. 70 m s^{-2}

✘ C. 240 m s^{-2}

✘ D. 280 m s^{-2}

Q.41 What is the length of a simple pendulum, which ticks seconds ?

Ans

✗ A. 2 m

✗ B. 4 m

✗ C. 3 m

✓ D. 1 m

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Q.42 Estimate the speed of sound in air at standard temperature and pressure. [The mass of 1 mole of air is 29.0 $\times 10^{-3}$ kg.]

Ans

✗ A. 330 m/s

✓ B. 280 m/s

✗ C. 310 m/s

✗ D. 300 m/s

Q.43 Two sitar strings A and B playing the note '*Dha*' are slightly out of tune and produce beats of frequency 5 Hz. The tension of the string B is slightly increased and the beat frequency is found to decrease to 3 Hz. What is the original frequency of B if the frequency of A is 427 Hz?

Ans

✗ A. 432 Hz

✗ B. 417 Hz

✗ C. 437 Hz

✓ D. 422 Hz

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Q.44 If 10^9 electrons move out of a body to another body every second, how much time is required to get a total charge of 1 C on the other body?

Ans

✗ A. 98 years

✗ B. 150 years

✗ C. 60 years

✓ D. 198 years

Q.45 How much positive and negative charge is there in a cup of water weighing 250g?

Ans

✔ A. 1.34×10^7 C

✘ B. 134×10^7 C

✘ C. 0.134×10^7 C

✘ D. 13.4×10^7 C

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Q.46 The electrostatic force on a small sphere of charge 0.4 μC due to another small sphere of charge -0.8 μC in the air is 0.2 N. What is the force on the second sphere due to the first?

Ans

✔ A. 0.2 N

✘ B. 0.4 N

✘ C. 0.8 N

✘ D. 0.1 N

Q.47 A point P is located 9 cm away from a point charge of 4×10^{-7}C .Obtain the work done in bringing a charge of 2×10^{-9} C from infinity to the point P.

Ans

✗ A. 6×10^{-5} J

✗ B. 2×10^{-9} J

✗ C. 18×10^{-9} J

✓ D. 8×10^{-5} J

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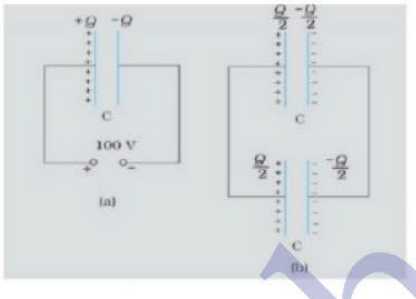
Q.48 A 900 pF capacitor is charged by 100 V battery. How much electrostatic energy is stored by the capacitor?



Ans

✗ A. 5.5×10^{-6} J

✓ B. 4.5×10^{-6} J

✗ C. 2.25×10^{-6} J

✗ D. 9.5×10^{-6} J

Q.49 The storage battery of a car has an emf of 12 V. If the internal resistance of the battery is 0.4 Ω, what is the maximum current that can be drawn from the battery?

Ans

✗ A. 48 A

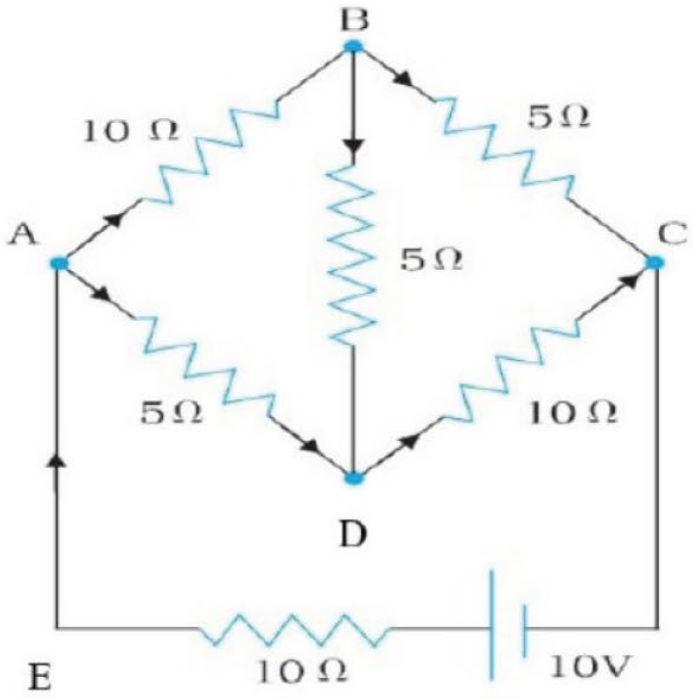
✗ B. 4.8 A

✓ C. 30 A

✗ D. 3 A

Q.50

Network of resistors are arranged as shown below.



How much current is flowing through BC branch?

Ans

✗ A. $\frac{8}{17}$ A

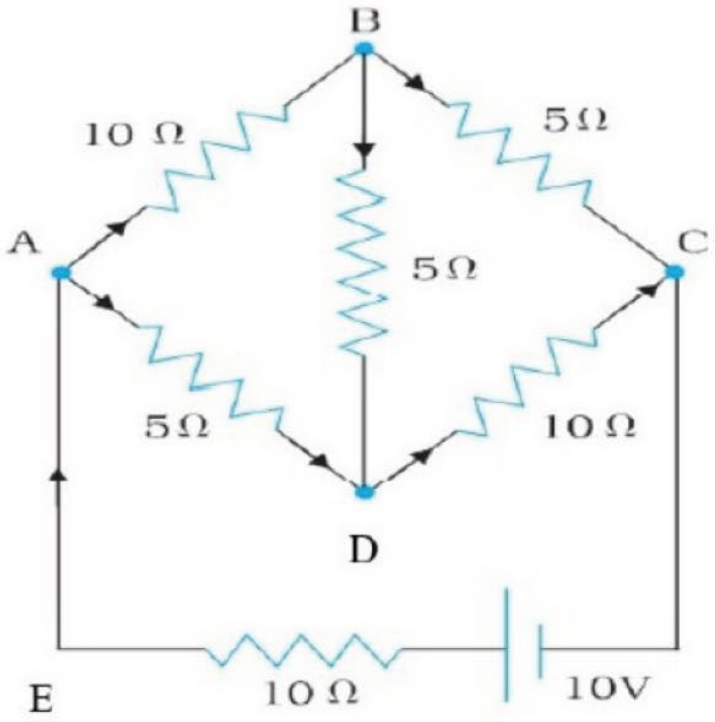
✗ B. $\frac{-4}{17}$ A

✓ C. $\frac{6}{17}$ A

✗ D. $\frac{-2}{17}$ A

Q.51

Network of resistors are arranged as shown below



How much current is flowing through AD branch?

Ans

✗ A. $\frac{-2}{17}$ A

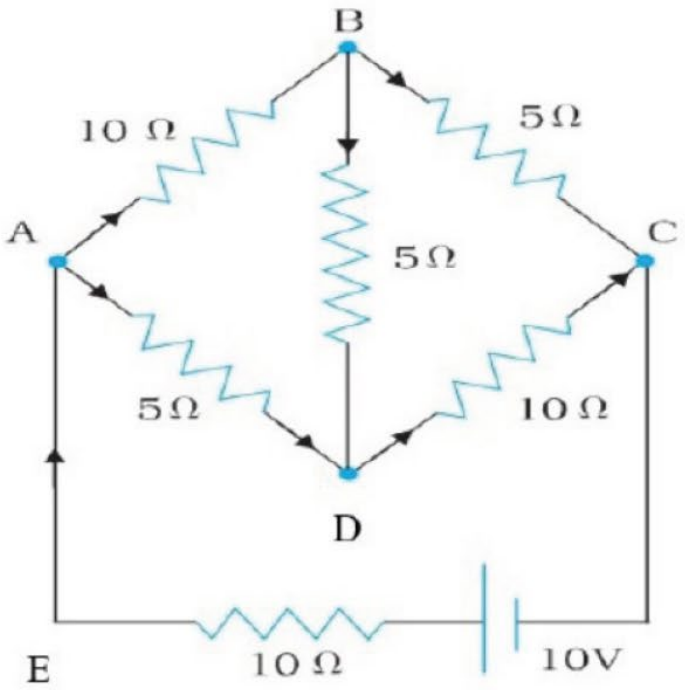
✗ B. $\frac{10}{17}$ A

✗ C. $\frac{8}{17}$ A

✓ D. $\frac{6}{17}$ A

Q.52

Network of resistors are arranged as shown below.



How much current is flowing through BD branch?

Ans

✗ A. $\frac{6}{17}$ A

✗ B. $\frac{4}{17}$ A

✓ C. $\frac{-2}{17}$ A

✗ D. $\frac{10}{17}$ A

Q.53 If the magnetic field is parallel to the positive *y*-axis and the charged particle is moving along the positive *x*-axis. Which way would the Lorentz force be for an electron (negative charge)?

Ans

✗ A. +x axis

✓ B. -z axis

✗ C. +z axis

✗ D. -y axis

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Q.54 What is the radius of the path of an electron (mass 9×10^{-31} kg and charge 1.6×10^{-19} C) moving at a speed of 3×10^{7} m/s in a magnetic field of 6×10^{-4} T perpendicular to it?

Ans

✗ A. 14 cm

✓ B. 28 cm

✗ C. 38 cm

✗ D. 56 cm

Q.55 Consider a tightly wound 100 turn coil of radius 10 cm, carrying a current of 1 A. What is the magnitude of the magnetic field at the centre of the coil?

Ans

✗ A. 12.56×10^{-4} T

✗ B. 18.84×10^{-4} T

✓ C. 6.28×10^{-4} T

✗ D. 3.14×10^{-4} T

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Q.56 If force (F), length (L) and time (T) are assumed to be fundamental units, then the dimensional formula of the mass will be:

Ans

✗ A. $[F\ L^{-1}\ T^{2}]$

✓ B. $[F\ L^{2}\ T^{2}]$

✗ C. $[F\ L^{-1}\ T^{-2}]$

✗ D. $[F\ L^{-1}\ T^{-1}]$

Q.57 Consider the acceleration, velocity and displacement of a tennis ball as its falls to the ground and bounces back. Directions of which of these change in the process?

Ans

✗ A. Displacement and acceleration

✗ B. Velocity only

✓ C. Displacement and velocity

✗ D. Acceleration, velocity and displacement

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Q.58 If the earth is at one-fourth of its present distance from the sun, the duration of year will be:

Ans

✓ A. one-eight the present year

✗ B. half the present year

✗ C. one-sixth the present year

✗ D. one-fourth the present year

Q.59 The temperature of an ideal gas is increased from 120 K to 480 K. If at 120 K, the root mean square velocity of the gas molecules is u, at 480 K it becomes:

Ans

✗ A. $4u$

✓ B. $2u$

✗ C. $\frac{u}{4}$

✗ D. $\frac{u}{2}$

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Q.60 A wire of a certain material is stretched slowly by ten per cent. Its new resistance and specific resistance become respectively:

Ans

✗ A. both remain the same

✗ B. 1.1 times, 1.1 times

✗ C. 1.2 times, 1.3 times

✓ D. 1.21 times, same

Q.61 A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What is its empirical formula?

Ans

✗ A. C_2H_3Cl

✗ B. C_2HCl_2

✗ C. CH_3Cl

✓ D. CH_2Cl

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Q.62 A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What is its molecular formula?

Ans

✗ A. $CHCl_3$

✗ B. CH_3Cl

✓ C. $C_2H_4Cl_2$

✗ D. CH_2Cl_2

Q.63 Calculate the amount of water (g) produced by the combustion of 16 g of methane?

Ans
✗ A. 9 g
✗ B. 54 g
✗ C. 18 g
✓ D. 36 g

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Q.64 50.0 kg of N_2 (g) and 10.0 kg of H_2 (g) are mixed to produce NH_3 (g). Calculate the amount of NH3 (g) formed?

$$N_2\,(g) + 3\,H_2\,(g) \rightleftharpoons 2NH_3\,(g)$$

Ans
✗ A. 65.9 kg
✗ B. 34.89 kg
✓ C. 56.1 kg
✗ D. 40.6 kg

Q.65 Calculate energy of one mole of photons of radiation whose frequency is 5×10^{14} Hz.

Ans

✔ A. 199.51 kJ

✘ B. 255.78 kJ

✘ C. 166.76 kJ

✘ D. 159.62 kJ

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Q.66 What will be the wavelength of a ball of mass 0.1 kg moving with a velocity of 10 m s^{-1}?

Ans

✘ A. 7.426×10^{-14} m

✔ B. 6.626×10^{-34} m

✘ C. 8.828×10^{-24} m

✘ D. 5.525×10^{-34} m

Q.67 A microscope using suitable photons is employed to locate an electron in an atom within a distance of 0.1 Å. What is the uncertainty involved in the measurement of its velocity?

Ans

✗ A. $7.79\times10^{8}\ m\ s^{-1}$

✓ B. $5.79\times10^{6}\ m\ s^{-1}$

✗ C. $8.69\times10^{9}\ m\ s^{-1}$

✗ D. $2.33\times10^{5}\ m\ s^{-1}$

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Q.68 What is the total number of orbitals associated with the principal quantum number n = 3 ?

Ans

✗ A. 6

✓ B. 9

✗ C. 12

✗ D. 3

Q.69 The number of protons, neutrons and electrons in $^{80}_{35}Br$ in the same order are

Ans
✗ A. 45, 35, 45
✗ B. 35, 35, 45
✗ C. 45, 45, 35
✓ D. 35, 45, 35

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Q.70 According to Aufbau's principle, which of the following order of energies of the orbitals are correct?

Ans
✗ A. 5p, 4f, 6p, 5d
✓ B. 5s, 4d, 5p, 4f
✗ C. 4p, 5s, 5p, 4d
✗ D. 3p, 3d, 4s, 4p

Q.71 What would be the IUPAC Nomenclature for the element with atomic number 120?

Ans
- ✗ A. Unbibium
- ✓ B. Unbinilium
- ✗ C. Unnilbium
- ✗ D. Ununbium

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Q.72 Which of the following species will have the largest size?

Ans
- ✗ A. Mg^{2+}
- ✗ B. Al
- ✓ C. Mg
- ✗ D. Al^{3+}

Q.73 Which of the following will have the most negative electron gain enthalpy?

Ans
✗ A. P
✓ B. Cl
✗ C. F
✗ D. S

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Q.74 Using the Periodic Table, predict the formulas of compounds which might be formed by the following pairs of elements: silicon and bromine

Ans
✗ A. Si_2Br_3
✗ B. SiBr
✓ C. $SiBr_4$
✗ D. $SiBr_2$

Q.75 What is the oxidation state of Al in $AlCl(H_2O)_5]^{2+}$?

Ans
- ✗ A. -2
- ✗ B. -3
- ✓ C. +3
- ✗ D. +2

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Q.76 Which of the following is the geometry of BF_3 molecule?

Ans
- ✗ A. Tetrahedral
- ✓ B. Trigonal-planar
- ✗ C. Trigonal-Pyramidal
- ✗ D. Bent

Q.77 A trigonal-bipyramidal shaped molecule will have which kind of hybridization?

Ans

✔ A. sp^3d

✘ B. dsp^2

✘ C. sp^3d^2

✘ D. d^2sp^3

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Q.78 The value of K_c for the reaction $2A \rightleftharpoons B + C$ is 2×10^{-3}. At a given time, the composition of reaction mixture is [A] = [B] = [C] = 3×10^{-4} M. In which direction the reaction will proceed?

Ans

✘ A. Reaction goes from left to right

✘ B. No net reaction occurs

✔ C. Reaction goes from right to left

✘ D. None of these

Q.79 Which of the following is correctly matched?

Ans

✗ A. F^- ⟶ Lewis Acid

✗ B. H^+ ⟶ Lewis Base

✗ C. OH^- ⟶ Lewis Acid

✓ D. BCl_3 ⟶ Lewis Acid

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Q.80 Which of the following is the correct order in which the given metals displace each other from their salts?

Ans

✗ A. Mg, Zn, Al, Fe, Cu

✗ B. Al, Cu, Fe, Mg, Zn

✓ C. Mg, Al, Zn, Fe, Cu

✗ D. Al, Cu, Mg, Fe, Zn

Q.81 How many σ and π bonds are present in the given molecule?

$CH_2=C=CHCH_3$

Ans

✗ A. 6 σ and 2 π bonds

✗ B. 2 σ and 9 π bonds

✗ C. 8 σ and 3 π bonds

✓ D. 9 σ and 2 π bonds

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Q.82 What is the type of hybridisation of each carbon in the given compound from left to right?

$CH_3CH=CHCN$

Ans

✗ A. sp, sp^3, sp^2, sp^2

✓ B. sp^3, sp^2, sp^2, sp

✗ C. sp^3, sp^3, sp^2, sp

✗ D. sp^2, sp^3, sp^2, sp

Q.83 What is the state of hybridisation of carbon in the given compound and its shape?

$HC{\equiv}N$

Ans

✗ A. sp^2 hybridised carbon, trigonal-pyramidal

✗ B. sp^2 hybridised carbon, trigonal planar

✓ C. sp hybridised carbon, linear

✗ D. sp^3 hybridised carbon, tetrahedral

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Q.84 Which of the following is an Electrophile?

Ans

✗ A. $C_2H_5O^-$

✓ B. BF_3

✗ C. HS^-

✗ D. $(CH_3)_3N$

Q.85 On complete combustion, 0.246 g of an organic compound gave 0.198g of carbon dioxide and 0.1014g of water. Determine the percentage composition of carbon in the compound?

Ans

✗ A. 25.67%

✗ B. 17.25%

✗ C. 26.66%

✓ D. 21.95%

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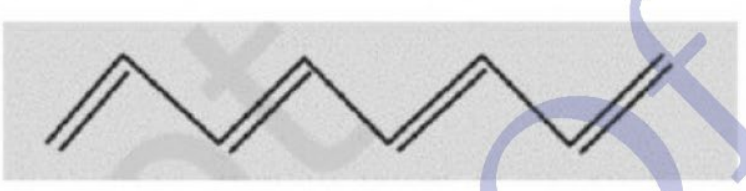
Q.86

Write IUPAC name of the given compound:



Ans

✗ A. 1,3,5,7 Ditetraene

✓ B. 1,3,5,7 Octatetraene

✗ C. 1,3,5,7 Octene

✗ D. 2,4,6,8 Octatetrane

Q.87 Which of the following compounds will NOT show cis-trans isomerism?

(i) $(CH_3)_2C = CH - C_2H_5$

(ii) $CH_2 = CBr_2$

(iii) $C_6H_5CH = CH - CH_3$

(iv) $CH_3CH = CCl\ CH_3$

Ans

✗ A. only (ii)

✓ B. only (i) and (ii)

✗ C. (iii) and (iv) only

✗ D. (i), (ii), and (iii) only

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Q.88 Calculate the mole fraction of ethylene glycol ($C_2H_6O_2$) in a solution containing 20% of $C_2H_6O_2$ by mass.

Ans

✗ A. 0.438

✓ B. 0.068

✗ C. 0.932

✗ D. 0.876

Q.89 Calculate molality of 2.5 g of ethanoic acid (CH_3COOH) in 75 g of benzene.

Ans

✗ A. $1.112\ mol\ kg^{-1}$

✓ B. $0.556\ mol\ kg^{-1}$

✗ C. $0.966\ mol\ kg^{-1}$

✗ D. $0.278\ mol\ kg^{-1}$

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Q.90 Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 298 K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of the solution prepared by mixing 25.5 g of $CHCl_3$ and 40 g of CH_2Cl_2 at 298 K

Ans

✓ A. 347.9 mm Hg

✗ B. 873.4 mm Hg

✗ C. 743.9 mm Hg

✗ D. 937.9 mm Hg

Q.91 Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 298 K are 200 mm Hg and 415 mm Hg respectively. What is the mole fractions of chloroform in vapour phase?

Ans

✗ A. 0.55

✓ B. 0.18

✗ C. 0.45

✗ D. 0.82

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Q.92 Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 298 K are 200 mm Hg and 415 mm Hg respectively. What is the mole fractions of dichloromethane in vapour phase?

Ans

✗ A. 0.55

✓ B. 0.82

✗ C. 0.45

✗ D. 0.18

Q.93 Which of the following ore is not concentrated by magnetic separation method?

Ans

✗ A. Siderite

✗ B. Haematite

✓ C. Zinc Blende

✗ D. Magnetite

Q.94 Why Iron scraps are preferred over Zinc scraps for reducing leached Copper ores?

Ans

✗ A. Zinc cannot reduce Copper

✓ B. Zinc is costlier metal than Iron

✗ C. Zinc is more reactive metal than Iron in Electrochemical series

✗ D. Iron is more reactive metal than Zinc in Electrochemical series

Q.95 Which of the following is not a method of refining?

Ans

✗ A. Electrolytic method

✗ B. Chromatographic method

✓ C. Leaching

✗ D. Distillation

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Q.96 Which of the following has the largest number of moles?

Ans

✗ A. 8 g of oxygen atoms

✗ B. 16 g of oxygen gas

✓ C. All have the same number of moles

✗ D. 14 g of nitrogen gas (N_2)

Q.97 The formation of CO and CO_2 illustrates the law of

Ans
- ✔ A. multiple proportion
- ✗ B. conservation of mass
- ✗ C. reciprocal proportion
- ✗ D. constant composition

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Q.98 Given the numbers :161 cm,0.161 cm,0.0161 cm. The number of significant figures for the three numbers are:

Ans
- ✗ A. 3,4 and 4 respectively
- ✔ B. 3,3 and 3 respectively
- ✗ C. 3,4 and 5 respectively
- ✗ D. 3,3 and 4 respectively

Q.99 The product of atomic weight and specific heat of any element is a constant, approximately 6.4. This is known as:

Ans

✗ A. Avogadro's law

✗ B. Dalton's law

✓ C. Dulong Pettit law

✗ D. Newton's law

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Q.100 The vapour density of ozone is

Ans

✓ A. 24

✗ B. 16

✗ C. 48

✗ D. 32

Q.101 Find the equation of the hyperbola where foci are (0, ±12) and the length of the latus rectum is

Ans

✗ A. $3x^2 - y^2 = 108$

✗ B. $3y^2 - x^2 = -108$

✓ C. $3y^2 - x^2 = 108$

✗ D. $3x^2 - y^2 = -108$

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Q.102 Find the distance between the parallel lines $3x - 4y + 7 = 0$ and $3x - 4y + 5 = 0$

Ans

✗ A. $\frac{7}{5}$

✗ B. $\frac{3}{7}$

✗ C. $\frac{3}{5}$

✓ D. $\frac{2}{5}$

Q.103 Suppose **X**= {1,2,3,4} and **R** is a relation on **X**. If **R**={(1,1),(2,2),(3,3),(1,2),(2,1),(2,3),(3,2)}, then, which one of the following is correct?

Ans

✗ A. R is reflexive and symmetric, but not transitive

✗ B. R is symmetric and transitive, but not reflexive

✗ C. R is reflexive and transitive, but not symmetric

✓ D. R is neither reflexive nor transitive, but symmetric

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Q.104 If $x + y \leq 4$, then how many non-zero positive integer ordered pair (x,y) satisfy this relation?

Ans

✗ A. 8

✗ B. 4

✗ C. 5

✓ D. 6

Q.105 If each of the observation x_1 , x_2 , ...,x_n is increased by 'a', where a is a negative or positive number, what would be the effect on variance?

Ans

✔ A. remains unchanged

✘ B. increases by a^2

✘ C. increases by a

✘ D. decreases by a^2

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Q.106 The roots of the equation $x^2 - 2\sqrt{2}x + 1 = 0$ are :

Ans

✘ A. Real and equal

✘ B. Imaginary and different

✘ C. Rational and different

✔ D. Real and different

Q.107 The greatest positive integer, which divides n(n+1)(n+2)(n+3) for all n∈N, is:

Ans
✗ A. 2
✗ B. 120
✗ C. 6
✓ D. 24

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Q.108 Equation of Directrix of the parabola $y^2 = 8x$ is:

Ans
✗ A. y = -2
✗ B. x = 2
✗ C. x = -4
✓ D. x = -2

Q.109 If $P(A \cup B) = 2/3$, $P(A \cap B) = 1/6$ and $P(A)=1/3$ then,

Ans

✔ A. A and B are independent events

✗ B. A and B are disjoint events

✗ C. A and B are dependent events

✗ D. None of these

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Q.110 A relation R in a set A is said to be an Equivalence relation if R is:

Ans

✗ A. Reflexive

✔ B. All of the above

✗ C. Transitive

✗ D. Symmetric

Q.111 What is the value of $\cos 46^\circ \cos 47^\circ \cos 48^\circ \cos 49^\circ \cos 50^\circ \ldots \cos 135^\circ$

Ans

✗ A. -1

✗ B. Greater than one

✗ C. 1

✓ D. 0

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Q.112 The latus rectum of the hyperbola $y^2 - 16x^2 = 16$ is

Ans

✗ A. $\frac{1}{5}$

✗ B. $\frac{16}{5}$

✓ C. $\frac{1}{2}$

✗ D. $\frac{1}{4}$

Q.113 Find the A.M. of the first ten odd numbers.

Ans

✗ A. 25

✗ B. 20

✓ C. 10

✗ D. 15

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Q.114 Find the value of $\lim_{x \to 2} \frac{x^3-4x^2+4x}{x^2-4}$

Ans

✗ A. ∞

✗ B. -2

✗ C. 1

✓ D. 0

Q.115 Find the diameter of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$.

Ans

✔ A. 14

✗ B. 7

✗ C. 8

✗ D. 6

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Q.116 Find the mean deviation about the mean for the following data: 6, 7, 10, 12, 13, 4, 8, 12

Ans

✔ A. 2.75

✗ B. 3

✗ C. 2.5

✗ D. 3.25

Q.117 If the sum of a certain number of terms of the A.P. 25,22,19,.... is 116 then the last term is:

Ans

✗ A. 0

✓ B. 4

✗ C. 6

✗ D. 2

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Q.118 Which of the following statements are true about the function given by f(x) = cos x

Ans

✓ A. All of the above

✗ B. decreasing in (0, π)

✗ C. increasing in (π, 2π)

✗ D. neither increasing nor decreasing in (0, 2π)

Q.119 Find the equation of the ellipse, with major axis along the x-axis and passing through the points (4, 3) and (– 1,4).

Ans

✗ A. $15x^2 + 7y^2 = 247$

✓ B. $7x^2 + 15y^2 = 247$

✗ C. $7x^2 + 15y^2 = -247$

✗ D. $15x^2 + 7y^2 = -247$

Q.120

What is the value of $\lim_{x\to 0} \frac{\{e^x-(1+x)\}}{x^2}$?

Ans

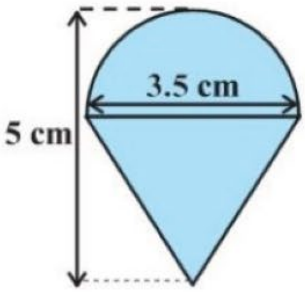
✗ A. 0

✗ B. 2

✗ C. 1

✓ D. $\frac{1}{2}$

Q.121 Rasheed got a playing top (*lattu*) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere (see Figure). The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the approximate area he has to colour. (Use $\pi = \frac{22}{7}$).



Ans
✗ A. 25 cm^2
✗ B. 50 cm^2
✗ C. 30 cm^2
✓ D. 40 cm^2

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Q.122 Find the value of 'a' such that the sum of the squares of the roots of the equation $x^2-(a-2)x-(a+1)=0$ is least:

Ans
✗ A. 3
✗ B. 4
✗ C. 2
✓ D. 1

Q.123 What is the solution of $(1 + 2x)\,dy - (1 - 2y)\,dx = 0$?

Ans

✗ A. $y + x - 2xy = c$

✗ B. $y - x - 2xy = c$

✗ C. $x + y + 2xy = c$

✓ D. $x - y - 2xy = c$

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Q.124 What is the distance of the point (2, 3, 4) from the plane 3x - 6y + 2z + 11?

Ans

✗ A. 4 units

✗ B. 2 units

✓ C. 1 unit

✗ D. 3 units

Q.125 The volume of a cube is increasing at a rate of 9 cubic centimetres per second. How fast is the surface area increasing when the length of an edge is 10 centimetres ?

Ans

✔ A. $3.6\ cm^2/s$

✗ B. $36\ cm^2/s$

✗ C. $7.2\ cm^2/s$

✗ D. $1.8\ cm^2/s$

Q.126 If | a | denotes the absolute value of an integer, then which of the following are correct?

1.$|ab|=|a||b|$

2.$|a+b|\leq|a|+|b|$

3.$|a-b|\geq|a|-|b|$

Select the correct answer using the code given below.

Ans

✗ A. 2 and 3 only

✓ B. 1,2 and 3

✗ C. 1 and 3 only

✗ D. 1 and 2 only

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Q.127 Which of the following laws relating to Sets are false ?

Ans

✓ A. $(A')' = U$

✗ B. $A \cap A' = \varphi$

✗ C. $A \cup A' = U$

✗ D. $(A \cap B)' = A' \cup B'$

Q.128 The 59 th term of an AP is 449 and the 449 th term is 59 . Which term is equal to 0 (zero)?

Ans

✗ A. 502^{nd} term

✓ B. 508^{th} term

✗ C. 501^{st} term

✗ D. 509^{th} term

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Q.129 The circle $x^2 + y^2 + 4x - 7y + 12 = 0$, cuts an intercept on y-axis equal to :

Ans

✓ A. 1

✗ B. 4

✗ C. 3

✗ D. 7

Q.130 In a binomial distribution, the mean is 4 and variance is 3 . Then its mode is:

Ans
✗ A. 5
✓ B. 4
✗ C. 6
✗ D. 8

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Q.131 If $x=2^{1/3} - 2^{-1/3}$, Then, what is the value of $2x^3 + 6x^2$?

Ans
✗ A. 2
✗ B. 1
✓ C. 3
✗ D. 4

Q.132 The length of the chord $x + y = 3$ intercepted by the circle $x^2+y^2-2x-2y-2=0$ is:

Ans

✗ A. $\frac{7}{4}$

✗ B. $\frac{\sqrt{7}}{2}$

✓ C. $\sqrt{14}$

✗ D. $\frac{3\sqrt{3}}{2}$

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Q.133 For r>0, f(r) is the ratio of perimeter to area of a circle of radius r. Then f(1)+f(2) is equal to :

Ans

✓ A. 3

✗ B. 4

✗ C. 1

✗ D. 2

Q.134 The function f : N → N, given by f(x) = 2x, is

Ans

✗ A. Surjective but not Injective

✓ B. Injective but not Surjective

✗ C. Bijective

✗ D. None of these

Q.135 Find the value of $\sin \frac{31\pi}{3}$

Ans

✗ A. $\frac{-1}{2}$

✗ B. $\frac{-\sqrt{3}}{2}$

✓ C. $\frac{\sqrt{3}}{2}$

✗ D. $\frac{1}{2}$

Q.136 The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who wrote by mistake 50 instead of 40 for one observation. What is the correct standard deviation?

Ans

✗ A. 4.8

✓ B. 5

✗ C. 4.9

✗ D. 5.2

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Q.137 The latus rectum of the ellipse $\frac{X^2}{25} + \frac{Y^2}{9} = 1$ is:

Ans

✗ A. $\frac{16}{5}$

✓ B. $\frac{18}{5}$

✗ C. $\frac{11}{5}$

✗ D. $\frac{12}{5}$

Q.138

The given equation represents: $2x^2-3y^2-6=0$

Ans

✔ A. A hyperbola

✗ B. A parabola

✗ C. An ellipse

✗ D. A circle

Q.139 If x is an integer and satisfies

$$9 < 4x - 1 \leq 19$$

then x is an element of which one of the following sets?

Ans

✗ A. {2, 3, 4, 5}

✗ B. {2, 3, 4}

✗ C. {3, 4}

✓ D. {3, 4, 5}

Question
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Q.140 Find the equation of the line, which makes intercepts –3 and 2 on the x- and y-axes respectively.

Ans

✗ A. 3x-2y+6=0

✗ B. 2x+3y-6=0

✓ C. 2x-3y+6=0

✗ D. 6x-2y+3=0

Q.141 Find the variance of the following data: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

Ans

✗ A. 38

✗ B. 35

✗ C. 36

✓ D. 33

Question
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Q.142 If two fair dice are rolled then what is the conditional probability that the first dice lands on 6 given that the sum of numbers on the dice is 8?

Ans

✗ A. $\frac{1}{3}$

✗ B. $\frac{1}{4}$

✗ C. $\frac{1}{6}$

✓ D. $\frac{1}{5}$

Q.143 When a hand of 7 cards is drawn from a well shuffled deck of 52 cards. What is the probability that it contains 3 Kings?

Ans

✔ A. $\frac{9}{1547}$

✘ B. $\frac{9}{7735}$

✘ C. $\frac{46}{7735}$

✘ D. $\frac{1}{7735}$

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Q.144 Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} and A = {1, 3, 5, 7, 9}. Find A′.

Ans

✘ A. { 1, 3, 6, 8,10 }

✘ B. { 2, 4, 6, 7,10 }

✔ C. { 2, 4, 6, 8,10 }

✘ D. { 2, 4, 5, 8,10 }

Q.145 Find the equation of the parabola which is symmetric about the y-axis, and passes through the point (2,–3).

Ans

✗ A. $3y^2 = 4x$

✗ B. $3x^2 = -2y$

✓ C. $3x^2 = -4y$

✗ D. $3x^2 = 4y$

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Q.146 Find the value of $\cos(-1710°)$.

Ans

✓ A. 0

✗ B. $\frac{-1}{2}$

✗ C. $\frac{-\sqrt{3}}{2}$

✗ D. $\frac{1}{2}$

Q.147 If $8x-9y=20$ and $7x-10y=9$, then what is $2x-y$ equal to?

Ans

✗ A. 11

✗ B. 12

✓ C. 10

✗ D. 13

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Q.148 Find the value of $sin^{-1}(sin\frac{3\pi}{5})$

Ans

✗ A. $\frac{\pi}{5}$

✓ B. $\frac{2\pi}{5}$

✗ C. $\frac{7\pi}{5}$

✗ D. $\frac{-\pi}{5}$

Q.149

The sum of the series is equal to : $3 - 1 + \frac{1}{3} - \frac{1}{9} + \frac{1}{27} \ldots\ldots\ldots \infty$

Ans

✗ A. $\frac{4}{9}$

✓ B. $\frac{9}{4}$

✗ C. $\frac{20}{9}$

✗ D. $\frac{9}{20}$

Q.150 If a flag-staff of 6 m height placed on the top of a tower throws a shadow of $2\sqrt{3}$ m along the ground, then what is the angle that the sun makes with the ground?

Ans

✗ A. 45^0

✓ B. 60^0

✗ C. 30^0

✗ D. 15^0