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IIITH UGEE 2019 Question Paper PDF

International Institute of Information Technology Undergraduate Entrance Examination (IIITH UGEE)

UGEE 2019 MEMORY BASED PAPER

UGEE 2019 Paper Pattern

PAPER	No. of Que	Time	Marking	Total Marks	Negative Marking
UGEE 2019	90	3 hr		140	
SUPR	50	1 hr	+1	50	0
REAP	40	2 hr	+2 for 30 Que +3 for 10 Que	90	0 for 30 Que -0.5 for 10 Que

TIME : 3 HRS *TOTAL MARKS : 140*

SUPR (SUBJECT PROFICIENCY TEST)

Physics

1. In amplitude modulation, the amplitude of carrier wave is A_c and that of the modulating signal is A_m. In practice, the ratio of A_m to A_c is kept less than or equal to one, to avoid
(a) distortion (b) attenuation
(c) fading (d) noise

2. A pipe open at both ends and a pipe closed at one end have same length. The ratio of frequencies of their P^{th} overtone is
(a) $\frac{p+1}{2p}$ (b) $\frac{p+1}{2p+1}$ (c) $\frac{2(p+1)}{2p+1}$ (d) $\frac{p}{2p+1}$

3. Glass has refractive index μ with respect to air and the critical angle for a ray of light going from glass to air is θ. If a ray of light is incident from air on the glass with angle of incidence θ, corresponding angle of refraction is
(a) $\sin^{-1}(\mu)$ (b) $\sin^{-1}\left(\frac{1}{\mu^2}\right)$
(c) $\sin^{-1}\left(\frac{1}{\sqrt{\mu}}\right)$ (d) $\sin^{-1}\left(\frac{1}{\mu}\right)$

4. Maximum kinetic energy gained by the charged particle in the cyclotron is independent of
(a) radius of the dees (b) charge
(c) mass (d) frequency of revolution

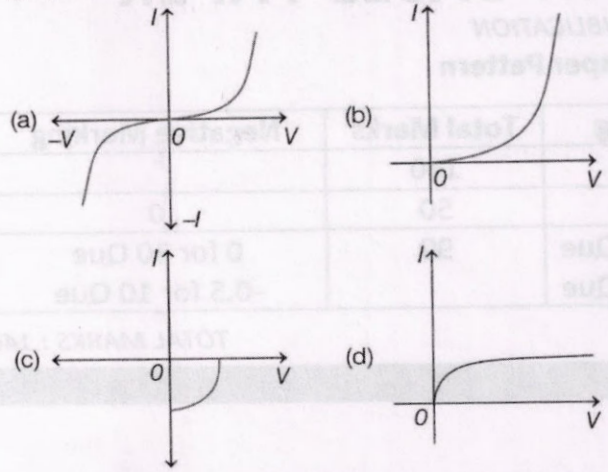
5. A molecule of water on the surface experiences a net
(a) downward resultant unbalanced adhesive force
(b) upward resultant unbalanced cohesive force
(c) downward resultant unbalanced cohesive force
(d) upward resultant unbalanced adhesive force

6. The magnifying power of a telescope is nine. When it is adjusted for parallel rays, the distance between the objective and eyepiece is 20 cm. The focal length of objective and eyepiece are respectively
(a) 10 cm, 10 cm (b) 18 cm, 2 cm
(c) 15 cm, 5 cm (d) 11 cm, 9 cm

7. The SI unit and dimensions of Stefan's constant σ in case of Stefan's law of radiation is
(a) $\frac{J}{m^3s^4}$, $[M^1L^0T^{-3}K^{-4}]$ (b) $\frac{J}{m^2s^4K}$, $[M^1L^0T^{-3}K^3]$
(c) $\frac{J}{m^3s\ K^4}$, $[M^1L^0T^{-3}K^4]$ (d) $\frac{J}{m^2s\ K^4}$, $[M^1L^0T^{-3}K^{-4}]$

8. In a hydrogen atom, an electron of charge e revolves in a orbit of radius r with speed v. Then, magnetic moment associated with electron is
(a) $\frac{evr}{2}$ (b) $2evr$ (c) evr (d) $\frac{evr}{3}$

9. *V-I* characterstics of LED is shown correctly by graph



10. The stopping potential of the photoelectrons, from a photo cell is

(a) directly proportional to intensity of incident light
(b) directly proportional to frequency of incident light
(c) inversely proportional to frequency of incident light
(d) Inversely proportional to intensity of incident light

11. The refractive index of the material of crystal is 1.68 and that of castor oil is 1.2. When a ray of light passes from oil to glass, its velocity will change by a factor

(a) $\frac{2}{3}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$ (d) $\frac{5}{7}$

12. Consider a particle of mass m suspended by a string at the equator. Let R and M denote radius and mass of the earth. If ω is the angular velocity of rotation of the earth about its own axis, then the tension on the string will be ($\cos 0^\circ = 1$)

(a) $\frac{GMm}{R^2}$ (b) $\frac{GMm}{2R^2}$
(c) $\frac{GMm}{2R^2} + m\omega^2 R$ (d) $\frac{GMm}{R^2} - m\omega^2 R$

13. Six very long insulated copper wires are bound together to form a cable. The currents carried by the wires are $I_1 = +10$ A, $I_2 = -13$ A, $I_3 = +10$ A, $I_4 = +7$ A, $I_5 = -12$ A and $I_6 = +18$ A. The magnetic induction at a perpendicular distance of 10 cm from the cable is ($\mu_0 = 4\pi \times 10^{-7}$ Wb/A-m)

(a) 40 μT (b) 37.5 μT (c) 30 μT (d) 35 μT

14. The fundamental frequency of sonometer wire increases by 9 Hz, if its tension is increased by 69 %, keeping the length constant. The frequency of the wire is

(a) 42 Hz (b) 24 Hz (c) 30 Hz (d) 36 Hz

15. In case of dimensions of electric field and electric dipole moment the power of mass is respectively,

(a) 1, 1 (b) 1, 0 (c) 0, 1 (d) 0, 0

16. A potentiometer wire has length L. For given cell of emf E, the balancing length is $\frac{L}{3}$ from the positive end of the wire. If the length of potentiometer wire is increased by 50%, then for the same cell, the balance point is obtained at length

(a) $\frac{L}{2}$ from positive end (b) $\frac{L}{5}$ from positive end
(c) $\frac{L}{3}$ from positive end (d) $\frac{L}{4}$ from positive end

17. For homogeneous isotropic material, which one of the following cannot be the value of Poisson's ratio?

(a) 0, 1 (b) –1 (c) 0.5 (d) 0.8

18. A mass is whirled in a circular path with constant angular velocity and its linear velocity is v. If the string is now halved keeping the angular momentum same, the linear velocity is

(a) $2v$ (b) $\frac{v}{2}$
(c) v (d) $v\sqrt{2}$

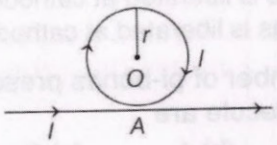
19. A circular coil and a square coil is prepared from two identical metal wires and a current is passed through it. Ratio of magnetic dipole moment associated with circular coil to that of square coil is

(a) $\frac{2}{\pi}$ (b) $\frac{\pi}{2}$
(c) π (d) $\frac{4}{\pi}$

20. In Young's double slit experiment fifth dark fringe is formed opposite to one of the slit. If D is the distance between the slits and the screen and d is the separation between the slits, then the wavelength of light used is

(a) $\frac{d^2}{5D}$ (b) $\frac{d^2}{9D}$ (c) $\frac{d^2}{6D}$ (d) $\frac{d^2}{15D}$

21. Figure show the circular coil carrying current I kept very close but not touching at a point A on a straight conductor carrying the same current I. The magnitude of magnetic induction at the centre of the circular coil will be



(a) $\frac{\mu_0 I}{2r}\left(1+\frac{1}{\pi}\right)$ (b) $\frac{\mu_0 I}{2\pi r}$

(c) $\frac{\mu_0 I}{2r}$ (d) zero

22. The vector equation of the plane $\mathrm{r} = (2\hat{\mathrm{i}} + \hat{\mathrm{k}}) + \lambda(\hat{\mathrm{i}}) + \mu(\hat{\mathrm{i}} + 2\hat{\mathrm{j}} - 3\hat{\mathrm{k}})$ in scalar product form is $\mathrm{r}\cdot(3\hat{\mathrm{i}} + 2\hat{\mathrm{k}}) = \alpha$, then $\alpha = \ldots$

(a) 2 (b) 3 (c) 1 (d) 0

23. Area of the region bounded by $y = \cos x, x = 0$, $x = \pi$ and X-axis is ...sq. units.

(a) 3 (b) 1 (c) 2 (d) 4

24. The length of the latusrectum of an ellipse is $\frac{18}{5}$ and eccentricity is $\frac{4}{5}$, then equation of the ellipse is ...

(a) $\frac{x^2}{25}+\frac{y^2}{8}=1$ (b) $\frac{x^2}{25}+\frac{y^2}{9}=1$

(c) $\frac{x^2}{25}+\frac{y^2}{16}=1$ (d) $\frac{x^2}{16}+\frac{y^2}{9}=1$

25. Let $a : \sim(p \wedge \sim r) \vee (\sim q \vee s)$ and $b : (p \vee s) \leftrightarrow (q \wedge r)$. If the truth values of p and q are true and that of r and s are false, then the truth values of a and b are respectively.....

(a) F, F (b) T, T (c) T, F (d) F, T

26. "If two triangles are congruent, then their areas are equal" is the given statement then the contrapositive of, the inverse of the given statement is

(a) If areas of two triangles are not equal then they are congruent

(b) If two triangles are not congruent then their areas are equal

(c) If two triangles are not congruent then their areas are not equal

(d) If areas of two triangles are equal then they are congruent

27. $\int \log x \cdot [\log(ex)]^{-2}\, dx = \ldots$

(a) $\frac{x}{1+\log x}+c$ (b) $x(1-\log x)+c$

(c) $x(1+\log x)+c$ (d) $\frac{x}{1-\log x}+c$

28. If $y = \log\left[\frac{x+\sqrt{x^2+25}}{\sqrt{x^2+25}-x}\right]$ then $\frac{dy}{dx} = \ldots\ldots$

(a) $\frac{1}{\sqrt{x^2+25}}$ (b) $\frac{2}{\sqrt{x^2+25}}$

(c) $\frac{-1}{\sqrt{x^2+25}}$ (d) $\frac{-2}{\sqrt{x^2+25}}$

29. If the scalar triple product of the vectors $-3\hat{\mathrm{i}} + 7\hat{\mathrm{j}} - 3\hat{\mathrm{k}}, 3\hat{\mathrm{i}} - 7\hat{\mathrm{j}} + \lambda\hat{\mathrm{k}}$ and $7\hat{\mathrm{i}} - 5\hat{\mathrm{j}} - 3\hat{\mathrm{k}}$ is 272 then $\lambda = \ldots\ldots$

(a) 9 (b) 11 (c) 8 (d) 10

30. The edge of a cube is decreasing at the rate of 0.04 cm/sec. If the edge of the cube is 10 cms, then rate of decrease of surface area of the cube is...

(a) 4.8 cm^2/sec (b) 4.08 cm^2/sec

(c) 48 cm^2/sec (d) 4.008 cm^2/sec

31. The joint equation of lines passing through origin and having slopes $(1+\sqrt{2})$ and $\frac{-1}{1+\sqrt{2}}$ is .....

(a) $x^2 + 2xy - y^2 = 0$ (b) $x^2 - 2\sqrt{2}xy - y^2 = 0$

(c) $x^2 - 2\sqrt{2}xy + y^2 = 0$ (d) $x^2 + 2xy + y^2 = 0$

32. If r is the radius of spherical balloon at time t and the surface area of balloon changes at a constant rate K, then.....

(a) $4\pi r^2 = \frac{Kt^2}{2} + c$ (b) $8\pi r^2 = Kt + c$

(c) $\pi r^2 = \frac{Kt^2}{2} + c$ (d) $4\pi r^2 = Kt + c$

33. $\int_0^{\frac{\pi}{2}} \sqrt{\cos\theta}\cdot\sin^3\theta\, d\theta = \ldots\ldots\ldots$

(a) $\frac{-20}{21}$ (b) $\frac{-8}{21}$ (c) $\frac{20}{21}$ (d) $\frac{8}{21}$

34. If ω is a complex cube root of unity and $A = \begin{bmatrix}\omega & 0 & 0\\ 0 & \omega^2 & 0\\ 0 & 0 & 1\end{bmatrix}$ then $A^{-1} = \ldots$

(a) $\begin{bmatrix}\omega^2 & 0 & 0\\ 0 & \omega & 0\\ 0 & 0 & 1\end{bmatrix}$ (b) $\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}$

(c) $\begin{bmatrix}1 & 0 & 0\\ 0 & \omega^2 & 0\\ 0 & 0 & \omega\end{bmatrix}$ (d) $\begin{bmatrix}0 & 0 & \omega\\ 0 & \omega^2 & 0\\ 1 & 0 & 0\end{bmatrix}$

35. If A and B are square matrices of order 3 such that $|A| = 2, |B| = 4$, then $|A(adj\ B)| = \ldots$

(a) 16 (b) 8 (c) 64 (d) 32

36. If $\int \frac{1}{1-\cot x}\,dx = Ax + B\log|\sin x - \cos x| + c$ then $A + B = \ldots\ldots$

(a) 1 (b) -1 (c) 0 (d) -2

37. The polar co-ordinates of P are $\left(2, \frac{\pi}{6}\right)$. If Q is the image of P about the X-axis then the polar co-ordinates of Q are……

(a) $\left(2, \frac{5\pi}{6}\right)$ (b) $\left(2, \frac{\pi}{6}\right)$ (c) $\left(2, \frac{\pi}{3}\right)$ (d) $\left(2, \frac{11\pi}{6}\right)$

38. a and b are non-collinear vectors. If $\mathrm{c} = (x-2)\,\mathrm{a} + \mathrm{b}$ and $\mathrm{d} = (2x+1)\mathrm{a} - \mathrm{b}$ are collinear vectors, then the value of $x = \ldots\ldots$

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{5}$ (d) $\frac{1}{3}$

39. Let X be the number of successes in 'n' independent Bernoulli trials with probability of success $p = \frac{3}{4}$. The least value of 'n' so that $P(X \geq 1) \geq 0.9375$ is ……

(a) 2 (b) 1 (c) 4 (d) 3

40. The slope of normal to the curve $x = \sqrt{t}$ and $y = t - \frac{1}{\sqrt{t}}$ at $t = 4$ is ……

(a) $\frac{-17}{4}$ (b) $\frac{4}{17}$ (c) $\frac{-4}{17}$ (d) $\frac{17}{4}$

41. What is the shape and magnetic nature of permanganate ion?

(a) Pyramidal diamagnetic
(b) Tetrahedral, diamagnetic
(c) Tetrahedral, paramagnetic
(d) Planar, paramagnetic

42. Which of the following oxides can act both as an oxidising agent as well as reducing agent?

(a) N_2O (b) SO_2
(c) SO_3 (d) P_2O_5

43. "The mass and energy both are conserved in an isolated system", is the statement of

(a) second law of thermodynamics
(b) third law of thermodynamics
(c) modified first law of thermodynamics
(d) first law of thermodynamics

44. Which among the following is correct for electrolysis of brine solution?

(a) O_2 gas is liberated at cathode
(b) Sodium metal is collected at anode
(c) H_2 gas is liberated at cathode
(d) Cl_2 gas is liberated at cathode

45. The number of pi-bonds present in benzoic acid molecule are

(a) 5 (b) 4 (c) 3 (d) 6

46. The elevation in boiling point of 0.25 molal aqueous solution of a substance is ($K_b = 0.52$ K kg mol^{-1})

(a) 0.15 K (b) 0.50 K (c) 0.13 K (d) 2.08 K

47. The combining ratios of hydrogen and oxygen in water and hydrogen peroxide are 1 : 8 and 1 : 16. Which law is illustrated in this example?

(a) Law of definite proportions
(b) Law of conservation of mass
(c) Gay Lussac's law of combining volumes of gases
(d) Law of multiple proportions

48. If a metal crystallises in bcc structure with edge length of unit cell 4.29×10^{-8} cm the radius of metal atom is

(a) 3.2×10^{-7} cm (b) 1.86×10^{-8} cm
(c) 1.07×10^{-7} cm (d) 1.07×10^{-8} cm

49. The temperature of 32°C is equivalent to

(a) 89.6°F (b) 85.6°F
(c) 70°F (d) 69°F

50. The element which does not belong to group 15 is

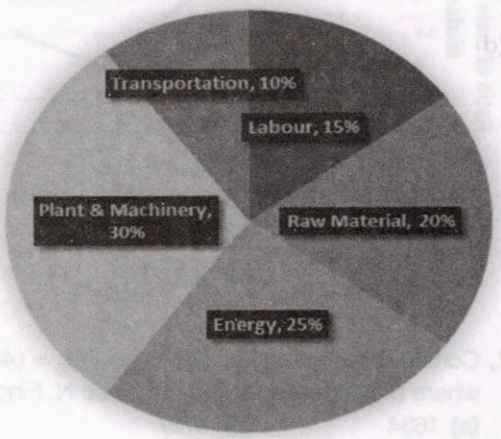
(a) As (b) P
(c) Bi (d) Se

REAP SECTION

1. Industrial consumption of power doubled from 2000-2001 to 2010-2011. Find the annual rate of increase in percent assuming it to be uniform over the years.

(a) 5.6 (b) 7.2
(c) 10.0 (d) 12.2

2. A firm producing air purifiers sold 200 units in 2012. The following pie chart presents the share of raw material, labour, energy, plant & machinery, and transportation costs in the total manufacturing cost of the firm in 2012. The expenditure on labour in 2012 is Rs. 4,50,000. In 2013, the raw material expenses increased by 30% and all other expenses increased by 20%. What is the percentage increase in total cost for the company in 2013?



3. A five digit number is formed using the digits 1,3,5,7 and 9 without repeating any of them. What is the sum of all such possible five digit numbers?

(a) 6666660 (b) 6666600
(c) 6666666 (d) 6666606

4. If $\left(z+\frac{1}{z}\right)^2 = 98$, compute $\left(z^2+\frac{1}{z^2}\right)$.

5. The roots of $ax^2 + bx + c = 0$ are real and positive a, b and c are real.

Then $ax^2 + b|x| + c = 0$ has

(a) no roots (b) 2 real roots
(c) 3 real roots (d) 4 real roots

6. Round-trip tickets to a tourist destination are eligible for a discount of 10% on the total fare. In addition, groups of 4 or more get a discount of 5% on the total fare. If the one way single person fare is Rs.100, a group of 5 tourists purchasing round trip tickets will be charged Rs. _____.

7. In a survey, 300 respondents were asked whether they own a vehicle or not. If yes, they were further asked to mention whether they own a car or scooter or both. Their responses are tabulated below. What percent of respondents do not own a scooter.

		Man	Women
Own Vehicle	Car	40	34
	Scooter	30	20
	Both	60	46
Do not own Vehicle		20	50

When a point inside of a tetrahedron (a solid with four triangular surfaces) is connected by straight lines to corners, how many (new) internal planes are created with these lines? _____

8. What is the average of all multiples of 10 from 2 to 198?

(a) 90 (b) 100
(c) 110 (d) 120

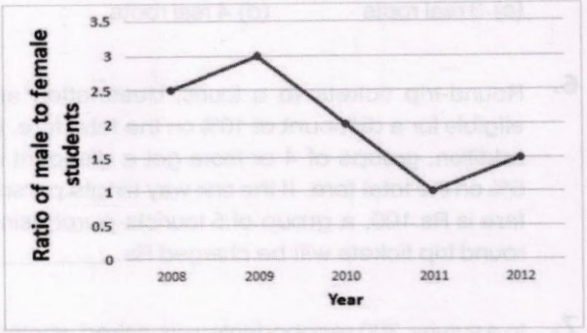
9. The value of $\sqrt{12+\sqrt{12+\sqrt{12+\ldots}}}$ is

(a) 3.464 (b) 3.932
(c) 4.000 (d) 4.444

10. If x is real and $|x^2 - 2x + 3| = 11$, then possible values of $|-x^3 + x^2 - x|$ include

(a) 2, 4 (b) 2, 14
(c) 4, 52 (d) 14, 52

11. The ratio of male to female students in a college for five years is plotted in the following line graph. If the number of female students doubled in 2009, by what percent did the number of male students increase in 2009?



12. At what time between 6 a.m. and 7 a.m. will the minute hand and hour hand of a clock make an angle closest to 60°?

(a) 6:22 a.m. (b) 6:27 a.m.
(c) 6:38 a.m. (d) 6:45 a.m.

13. Which number does not belong in the series below?

2, 5, 10 17, 26, 37, 50, 64

(a) 17 (b) 37
(c) 64 (d) 26

14. The table below has question wise data on the performance of students in an examination. The marks for each question are also listed. There is no negative or partial marking in the examination.

Q.No.	Marks	Answered Correctly	Answered Wrongly	Not Attemped
1	2	21	17	6
2	3	15	27	2
3	2	23	18	3

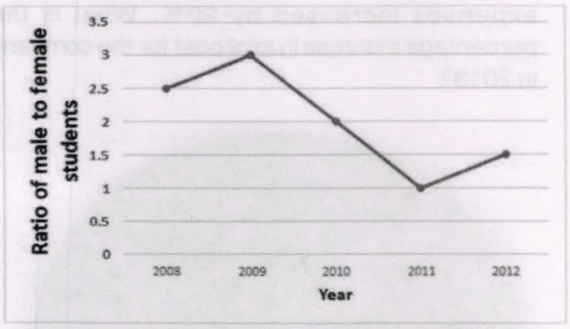
What is the average of the marks obtained by the class in the examination?

(a) 1.34 (b) 1.74
(c) 3.02 (d) 3.91

15. The Gross Domestic Product (GDP) in Rupees grew at 7% during 2012-2013. For international comparison, the GDP is compared in US Dollars (USD) after conversion based on the market exchange rate. During the period 2012-2013 the exchange rate for the USD increased from Rs. 50/ USD to Rs.60/ USD. India's GDP in USD during the period 2012-2013.

(a) Increased by 5%
(b) Decreased by 13%
(c) Decreased by 20%
(d) Decreased by 11%

16. The ratio of male to female students in a college for five years is plotted in the following line graph. If the number of female students in 2011 and 2012 is equal, what is the ratio of male students in 2012 to male students in 2011?



(a) 1 : 1 (b) 2 : 1
(c) 1.5 : 1 (d) 2.5 : 1

17. Consider the equation: $(7526)_8 - (Y)_8 = (4364)_8$, where $(X)_N$ stands for X to the base N. Find Y.

(a) 1634 (b) 1737
(c) 3142 (d) 3162

18. If $y = 5x^2 + 3$, then the tangent at $x = 0$, $y = 3$

(a) passes through $x = 0$, $y = 0$
(b) has a slope of +1
(c) is parallel to the x-axis
(d) has a slope of -1

19. A foundry has a fixed daily cost of Rs 50,000 whenever it operates and a variable cost of Rs 800Q, where Q is the daily production in tonnes. What is the cost of production in Rs per tonne for a daily production of 100 tonnes?

20. Find the odd one in the following group: ALRVX, EPVZB, ITZDF, OYEIK

(a) ALRVX (b) EPVZB
(c) ITZDF (d) OYEIK

21. Anuj, Bhola, Chandan, Dilip, Eswar and Faisal live on different floors in a six-storeyed building (the ground floor is numbered 1, the floor above it 2, and so on). Anuj lives on an even-numbered floor. Bhola does not live on an odd numbered floor. Chandan does not live on any of the floors below Faisal's floor. Dilip does not live on floor number 2. Eswar does not live on a floor immediately above or immediately below Bhola. Faisal lives three floors above Dilip. Which of the following floor-person combination is correct?

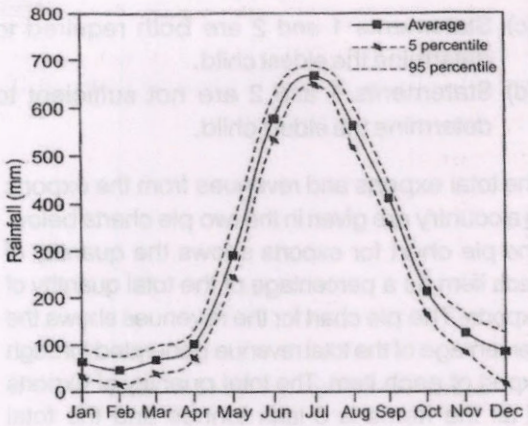
	Anuj	Bhola	Chandan	Dilip	Eswar	Faisal
(a)	6	2	5	1	3	4
(b)	2	6	5	1	3	4
(c)	4	2	6	3	1	5
(d)	2	4	6	1	3	5

22. The smallest angle of a triangle is equal to two thirds of the smallest angle of a quadrilateral. The ratio between the angles of the quadrilateral is 3:4:5:6. The largest angle of the triangle is twice its smallest angle. What is the sum, in degrees, of the second largest angle of the triangle and the largest angle of the quadrilateral?

23. One percent of the people of country X are taller than 6 ft. Two percent of the people of country Y are taller than 6 ft. There are thrice as many people in country X as in country Y. Taking both countries together, what is the percentage of people taller than 6 ft?

(a) 3.0 (b) 2.5
(c) 1.5 (d) 1.25

24. The monthly rainfall chart based on 50 years of rainfall in Agra is shown in the following figure. Which of the followings are true? (*k* percentile is the value such that k percent of the data fall below that value)



(i) On average, it rains more in July than in December
(ii) Every year, the amount of rainfall in August is more than that in January
(iii) July rainfall can be estimated with better confidence than February rainfall
(iv) In August, there is at least 500 mm of rainfall

(a) (i) and (ii) (b) (i) and (iii)
(c) (ii) and (iii) (d) (iii) and (iv)

25. In any given year, the probability of an earthquake greater than Magnitude 6 occurring in the Garhwal Himalayas is 0.04. The average time between successive occurrences of such earthquakes is ____ years.

26. The population of a new city is 5 million and is growing at 20% annually. How many years would it take to double at this growth rate?

(a) 3-4 years (b) 4-5 years
(c) 5-6 years (d) 6-7 years

27. In a group of four children, Som is younger to Riaz. Shiv is elder to Ansu. Ansu is youngest in the group. Which of the following statements is/are required to find the eldest child in the group?

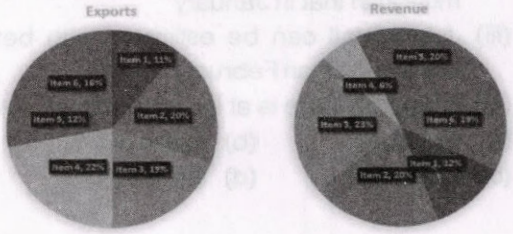
Statements

1. Shiv is younger to Riaz.
2. Shiv is elder to Som.

(a) Statement 1 by itself determines the eldest child.
(b) Statement 2 by itself determines the eldest child.

(c) Statements 1 and 2 are both required to determine the eldest child.
(d) Statements 1 and 2 are not sufficient to determine the eldest child.

28. The total exports and revenues from the exports of a country are given in the two pie charts below. The pie chart for exports shows the quantity of each item as a percentage of the total quantity of exports. The pie chart for the revenues shows the percentage of the total revenue generated through export of each item. The total quantity of exports of all the items is 5 lakh tonnes and the total revenues are 250 crore rupees. What is the ratio of the revenue generated through export of Item 1 per kilogram to the revenue generated through export of Item 4 per kilogram?



(a) 1 : 2 (b) 2 : 1
(c) 1 : 4 (d) 4 : 1

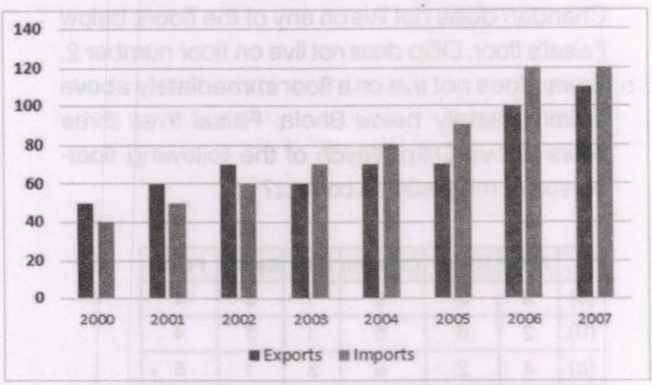
29. X is 1 km northeast of Y. Y is 1 km southeast of Z. W is 1 km west of Z. P is 1 km south of W. Q is 1 km east of P. What is the distance between X and Q in km?
(A) 1 (b) $\sqrt{2}$
(c) $\sqrt{3}$ (d) 2

30. 10% of the population in a town is HIV$^+$. A new diagnostic kit for HIV detection is available; this kit correctly identifies HIV$^+$ individuals 95% of the time, and HIV$^-$ individuals 89% of the time. A particular patient is tested using this kit and is found to be positive. The probability that the individual is actually positive is _____.

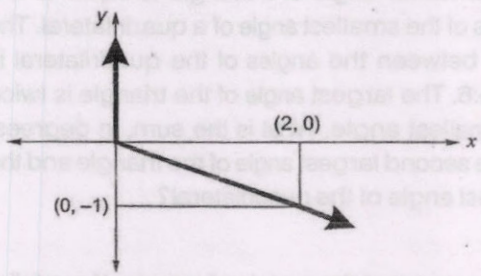
31. If ROAD is written as URDG, then SWAN should be written as:
(a) VXDQ (b) VZDQ
(c) VZDP (d) UXDQ

32. A function $f(x)$ is linear and has a value of 29 at $x = -2$ and 39 at $x = 3$. Find its value at $x = 5$.
(a) 59 (b) 45
(c) 43 (d) 35

33. The exports and imports (in crores of Rs.) of a country from the year 2000 to 2007 are given in the following bar chart. In which year is the combined percentage increase in imports and exports the highest?



34. Choose the most appropriate equation for the function drawn as a thick line, in the plot below:



(a) $x = y - |y|$
(b) $x = -(y - |y|)$
(c) $x = y + |y|$
(d) $x = -(y + |y|)$

35. The head of a newly formed government desires to appoint five of the six selected members P, Q, R, S, T and U to portfolios of Home, Power, Defense, Telecom, and Finance. U does not want any portfolio if S gets one of the five. R wants either Home or Finance or no portfolio. Q says that if S gets either Power or Telecom, then she

must get the other one. *T* insists on a portfolio if *P* gets one.
Which is the valid distribution of portfolios?
(a) *P*-Home, *Q*-Power, *R*-Defence, *S*-Telecom, *T*-Finance
(b) *R*-Home, *S*-Power, *P*-Defence, *Q*-Telecom, *T*-Finance
(c) *P*-Home, *Q*-Power, *T*-Defence, *S*-Telecom, *U*-Finance
(d) *Q*-Home, *U*-Power, *T*-Defence, *R*-Telecom, *P*-Finance

36. Four cards are randomly selected from a pack of 52 cards. If the first two cards are kings, what is the probability that the third card is a king?
(a) $\frac{4}{52}$ (b) $\frac{2}{50}$
(c) $\left(\frac{1}{52}\right)\times\left(\frac{1}{52}\right)$ (d) $\left(\frac{1}{52}\right)\times\left(\frac{1}{51}\right)\times\left(\frac{1}{50}\right)$

37. Mr. Vivek walks 6 meters North-East, then turns and walks 6 meters South-East, both at 60 degrees to East. He further moves 2 meters South and 4 meters West. What is the straight distance in meters between the point he started from and the point he finally reached?
(a) $2\sqrt{2}$ (b) 2
(c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

38. Read the following table giving sales data of five types of batteries for years 2006 to 2012

Year	Type I	Type II	Type III	Type IV	Type V
2006	75	144	114	102	108
2007	90	126	102	84	126
2008	96	114	75	105	135
2009	105	90	150	90	75
2010	90	75	135	75	90
2011	105	60	165	45	120
2012	115	85	160	100	145

Out of the following, which type of battery achieved highest growth between the years 2006 and 2012?
(a) Type V (b) Type III
(c) Type II (d) Type I

39. How many four digit numbers can be formed with the 10 digits 0, 1, 2, ... 9 if no number can start with 0 and if repetitions are not allowed?

40. The given question is followed by two statements; select the most appropriate option that solves the question
Capacity of a solution tank *A* is 70% of the capacity of tank *B*. How many gallons of solution are in tank *A* and tank *B*?
Statements:
I. Tank A is 80% full and tank B is 40% full.
II. Tank A if full contains 14,000 gallons of solution.
(a) Statement I alone is sufficient.
(b) Statement II alone is sufficient.
(c) Either statement I or II alone is sufficient.
(d) Both the statements I and II together are sufficient.

41. There are 16 teachers who can teach Thermodynamics (TD), 11 who can teach Electrical Sciences (ES), and 5 who can teach both TD and Engineering Mechanics (EM). There are a total of 40 teachers. 6 cannot teach any of the three subjects, i.e. EM, ES or TD. 6 can teach only ES. 4 can teach all three subjects, i.e. EM, ES and TD. 4 can teach ES and TD. How many can teach both ES and EM but not TD?
(a) 1 (b) 2
(c) 3 (d) 4

42. Consider a function $f(x) = 1 - |x|$ on $-1 \le x \le 1$. The value of x at which the function attains a maximum, and the maximum value of the function are:
(a) 0, – 1 (b) –1, 0
(c) 0, 1 (d) –1, 2

UGEE 2019 SOLUTIONS

Answers of UGEE 2019 SUPR

1	A	11	D	21	*	31	A	41	B
2	C	12	D	22	A	32	D	42	B
3	B	13	A	23	C	33	D	43	C
4	D	14	C	24	B	34	A	44	C
5	C	15	B	25	A	35	D	45	B
6	B	16	A	26	D	36	A	46	C
7	D	17	D	27	A	37	D	47	D
8	A	18	A	28	B	38	D	48	B
9	B	19	D	29	B	39	A	49	A
10	B	20	B	30	A	40	C	50	D

Answers of UGEE 2019 REAP

1	B	11	140	21	B	31	B
2	22	12	A	22	180	32	C
3	B	13	C	23	D	33	4.54
4	96	14	C	24	B	34	B
5	D	15	D	25	25	35	B
6	850	16	C	26	A	36	B
7	48	17	C	27	A	37	A
8	B	18	C	28	D	38	D
9	C	19	1300	29	C	39	4536
10	D	20	D	30	0.4896	40	D
						41	A
						42	C