

DU MSc Informatics IIC

Topic:- DU_J19_MSC_INFO

1) Directions: Read the following information carefully and answer the questions given below:

Six persons P, Q, R, S, T and U are sitting in two rows, three in each.

T is not at the end of any row.

S is second to the left of U

R, the neighbor of T, is sitting diagonally opposite to S

Q is the neighbor of U.

Which of the following are sitting diagonally opposite to each other?

[Question ID = 25648]

1. S and P [Option ID = 42588]
2. P and R [Option ID = 42589]
3. P and U [Option ID = 42590]
4. U and R [Option ID = 42587]

Correct Answer :-

- P and U [Option ID = 42590]

2) Directions: Read the following information carefully and answer the questions given below:

Six persons P, Q, R, S, T and U are sitting in two rows, three in each.

T is not at the end of any row.

S is second to the left of U

R, the neighbor of T, is sitting diagonally opposite to S

Q is the neighbor of U.

Which of the following are in one of the two rows?

[Question ID = 25649]

1. UQR [Option ID = 42591]
2. RTQ [Option ID = 42592]
3. SQU [Option ID = 42593]
4. PTU [Option ID = 42594]

Correct Answer :-

- SQU [Option ID = 42593]

3) Direction: Choose the most appropriate preposition:

The mother was anxious the safety of her son.

[Question ID = 25640]

1. for [Option ID = 42557]
2. upon [Option ID = 42558]
3. about [Option ID = 42556]
4. at [Option ID = 42555]

Correct Answer :-

- about [Option ID = 42556]

4) Direction: Choose the most appropriate preposition:

The reward was not commensurate the work done by us.

[Question ID = 25642]

1. order [Option ID = 42566]
2. with [Option ID = 42565]
3. for [Option ID = 42563]
4. on [Option ID = 42564]

Correct Answer :-

- with [Option ID = 42565]

5) Direction: Choose the most appropriate preposition:

He had to repent what he had done.

[Question ID = 25641]

1. of [Option ID = 42560]
2. for [Option ID = 42562]
3. over [Option ID = 42561]
4. at [Option ID = 42559]

Correct Answer :-

- for [Option ID = 42562]

6) Direction: Choose the most appropriate preposition:

Our tragic experience in the recent past provides an index..... The state of lawlessness in this region.

[Question ID = 25643]

1. by [Option ID = 42570]
2. of [Option ID = 42567]
3. in [Option ID = 42568]
4. at [Option ID = 42569]

Correct Answer :-

- of [Option ID = 42567]

7) If the binding energy of the electron in a hydrogen atom is 13.6eV , the energy required to remove the electron from the first excited state of Li^{2+} is [Question ID = 25693]

1. 13.6eV [Option ID = 42769]

2. 3.4eV [Option ID = 42770]
3. 30.6eV [Option ID = 42767]
4. 122.4eV [Option ID = 42768]

Correct Answer :-

- 30.6eV [Option ID = 42767]

8) If the angle between the direction of incident X-ray and diffracted one is 16° , the angle of incidence will be [Question ID = 25697]

1. 24° [Option ID = 42786]
2. 90° [Option ID = 42785]
3. 32° [Option ID = 42784]
4. 82° [Option ID = 42783]

Correct Answer :-

- 82° [Option ID = 42783]

9) Moving clock loses 1 minute in each hour. The speed of clock is [Question ID = 25679]

1. $2.7 \times 10^8 \text{ ms}^{-1}$ [Option ID = 42713]
2. $5.4 \times 10^7 \text{ ms}^{-1}$ [Option ID = 42711]
3. $5.4 \times 10^8 \text{ ms}^{-1}$ [Option ID = 42712]
4. $0.7 \times 10^7 \text{ ms}^{-1}$ [Option ID = 42714]

Correct Answer :-

- $0.7 \times 10^7 \text{ ms}^{-1}$ [Option ID = 42714]

10) Calculate the root mean square speed of the molecules of hydrogen gas at S.T.P . Density of hydrogen at S.T.P. is $9 \times 10^{-2} \text{ kg.m}^{-3}$. [Question ID = 25687]

1. 1540ms^{-1} [Option ID = 42743]
2. 1740ms^{-1} [Option ID = 42745]
3. 1840ms^{-1} [Option ID = 42746]
4. 1640ms^{-1} [Option ID = 42744]

Correct Answer :-

- 1840ms^{-1} [Option ID = 42746]

11) A young fat girl dances with high velocity , she will appear to her stationary friend [Question ID = 25678]

1. less fat [Option ID = 42707]
2. more fat [Option ID = 42708]
3. some time less and some time more fat [Option ID = 42710]
4. of same dimension [Option ID = 42709]

Correct Answer :-

- less fat [Option ID = 42707]

12) Without any additional circuitry, and 8:1 MUX can be used to obtain [Question ID = 25666]

1. all functions of 4 variables. [Option ID = 42662]

2. all functions of 3 variables but none of 4 variables. [Option ID = 42660]
3. all functions of 3 variables and some but not all of 4 variables. [Option ID = 42661]
4. some but not all Boolean functions of 3 variables. [Option ID = 42659]

Correct Answer :-

- all functions of 3 variables and some but not all of 4 variables. [Option ID = 42661]

13) The electric field inside a conducting material of radius R is [Question ID = 25681]

1. $\frac{q}{4\pi\epsilon_0 R^2}$ [Option ID = 42721]
2. $\frac{q}{4\pi\epsilon_0 r^2}$ [Option ID = 42720]
3. $\frac{qr}{4\pi\epsilon_0 R^3}$ [Option ID = 42719]
4. zero [Option ID = 42722]

Correct Answer :-

- zero [Option ID = 42722]

14) In a BPSK signal detector , the local oscillator has a fixed error of 20° . This phase error deteriorates the SNR at the output by a factor of [Question ID = 25673]

1. $\cos 20^\circ$ [Option ID = 42687]
2. $\cos^2 70^\circ$ [Option ID = 42690]
3. $\cos^2 20^\circ$ [Option ID = 42688]
4. $\cos 70^\circ$ [Option ID = 42689]

Correct Answer :-

- $\cos^2 20^\circ$ [Option ID = 42688]

15) Two coherent sources are placed 1mm apart and generate interference fringes on a screen 0.9m away. The second dark fringe is formed at a distance of 0.9mm from the central fringe. Determine the wavelength of the monochromatic light used.

[Question ID = 25689]

1. 6000 Å [Option ID = 42753]
2. 5000 Å [Option ID = 42752]
3. 4000 Å [Option ID = 42751]
4. 7000 Å [Option ID = 42754]

Correct Answer :-

- 4000 Å [Option ID = 42751]

16) A planet moves round the sun. At a point P, it is closest to the sun at a distance r_1 and has speed v_1 . At another point Q , when it is farthest from the sun at a distance r_2 , what is its speed?

[Question ID = 25881]

1. $\frac{r_1 v_1}{r_2}$ [Option ID = 43520]

2. $\frac{r_2 v_1}{r_1}$ [Option ID = 43522]

3. $\frac{r_1^2 v_1}{r_2^2}$ [Option ID = 43519]

4. $\frac{r_2^2 v_2}{r_1^2}$ [Option ID = 43521]

Correct Answer :-

• $\frac{r_1 v_1}{r_2}$ [Option ID = 43520]

17) Solve the initial value problem $y'' + 6y' + 13y = 0; y(0) = 3, y'(0) = 7$

[Question ID = 25715]

1. $y(x) = e^{3x} (3 \cos 2x - 8 \sin 2x)$ [Option ID = 42858]
2. $y(x) = e^{-x} (3 \cos 2x + 8 \sin 2x)$ [Option ID = 42855]
3. $y(x) = e^{-2x} (3 \cos 2x - 8 \sin 2x)$ [Option ID = 42856]
4. $y(x) = e^{-3x} (3 \cos 2x + 8 \sin 2x)$ [Option ID = 42857]

Correct Answer :-

• $y(x) = e^{-3x} (3 \cos 2x + 8 \sin 2x)$ [Option ID = 42857]

18) An amplifier has an open-loop gain of 100, an input impedance of $1k\Omega$, and an output impedance of 100Ω . A feedback network with a feedback factor of 0.99 is connected to the amplifier in a voltage series feedback mode. The new input and output impedances, respectively, are [Question ID = 25662]

1. $100k\Omega, 1k\Omega$ [Option ID = 42646]
2. $100k\Omega, 1\Omega$ [Option ID = 42645]
3. $10\Omega, 1\Omega$ [Option ID = 42643]
4. $10\Omega, 10\Omega$ [Option ID = 42644]

Correct Answer :-

• $100k\Omega, 1\Omega$ [Option ID = 42645]

19) An 8085 executes the following instructions

**2710H LXI H, 30A0H
2713H DAD H
2714H PCHL**

All addresses and constants are in Hex. Let PC be the contents of the program counter and HL be the contents of the HL register pair just after executing PCHL.

Which of the following statements is correct?

[Question ID = 25668]

1. PC = 6140H HL = 6140H [Option ID = 42669]
2. PC = 6140H HL = 2715H [Option ID = 42670]
3. PC = 2715H HL = 30A0H [Option ID = 42667]
4. PC = 30A0H HL = 2715H [Option ID = 42668]

Correct Answer :-

- PC = 6140H HL = 6140H [Option ID = 42669]

20) In the 8085 microprocessor , the TST6 instruction transfers the program execution to the following location: [Question ID = 25669]

1. 24H [Option ID = 42672]
2. 30H [Option ID = 42671]
3. 60H [Option ID = 42674]
4. 48H [Option ID = 42673]

Correct Answer :-

- 30H [Option ID = 42671]

21) A signal $x(t)=2\cos(\pi \cdot 10^4 t)$ volts is applied to an FM modulator with the sensitivity constant of 10kHz/volt. Then the modulation index of the FM wave is

[Question ID = 26444]

1. $4/\pi$ [Option ID = 45773]
2. 4 [Option ID = 45771]
3. 2 [Option ID = 45772]
4. $2/\pi$ [Option ID = 45774]

Correct Answer :-

- 4 [Option ID = 45771]

22) Introducing a resistor in the emitter of a common emitter amplifier stabilizes the dc operating point against variation in [Question ID = 25660]

1. only in temperature [Option ID = 42635]
2. only the β of the transistor [Option ID = 42636]
3. none of the above [Option ID = 42638]
4. both temperature and β [Option ID = 42637]

Correct Answer :-

- both temperature and β [Option ID = 42637]

23) The de-Broglie wavelength of a particle having kinetic energy $KE = E_k$ is given by [Question ID = 25686]

1. $\lambda = h/\sqrt{E_k}$ [Option ID = 42739]
2. $\lambda = h/\sqrt{2\pi m E_k}$ [Option ID = 42742]
3. $\lambda = h/\sqrt{2m E_k}$ [Option ID = 42741]
4. $\lambda = h/\sqrt{m E_k}$ [Option ID = 42740]

Correct Answer :-

• $\lambda = \frac{h}{\sqrt{2mE_k}}$ [Option ID = 42741]

24) The dielectric constant of a material at optical frequency is mainly due to [Question ID = 25683]

1. electronic polarizability [Option ID = 42727]
2. dipolar polarizability [Option ID = 42729]
3. ionic polarizability [Option ID = 42728]
4. ionic and dipolar polarizability [Option ID = 42730]

Correct Answer :-

- electronic polarizability [Option ID = 42727]

25) A laser beam of pulse power 10^{12} W is focused on an object of area 10^{-4} cm². The energy flux in W/cm², at the point of focus is [Question ID = 25696]

1. 10^{16} [Option ID = 42781]
2. 10^4 [Option ID = 42782]
3. 10^{20} [Option ID = 42779]
4. 10^8 [Option ID = 42780]

Correct Answer :-

- 10^{16} [Option ID = 42781]

26) A laser beam of wavelength of 600nm with a circular –section having a radius of 10mm falls normally on a lens of radius 20mm and focal length 10cm. The radius of the focused spot is approximately [Question ID = 25695]

1. $3.0\mu\text{m}$ [Option ID = 42777]
2. $6.0\mu\text{m}$ [Option ID = 42778]
3. $0.3\mu\text{m}$ [Option ID = 42775]
4. $0.6\mu\text{m}$ [Option ID = 42776]

Correct Answer :-

- $3.0\mu\text{m}$ [Option ID = 42777]

27) Fill in the blanks with appropriate phrasal verbs from the alternatives given below under each item.

He is making his career in sales

[Question ID = 25629]

1. committed in [Option ID = 42512]
2. committed to [Option ID = 42514]
3. committed for [Option ID = 42511]
4. committed with [Option ID = 42513]

Correct Answer :-

- committed to [Option ID = 42514]

28)

Fill in the blanks with appropriate phrasal verbs from the alternatives given below under each item.

Several people have sick today.

[Question ID = 25630]

1. called for [Option ID = 42516]
2. called on [Option ID = 42517]
3. called in [Option ID = 42515]
4. called to [Option ID = 42518]

Correct Answer :-

- called in [Option ID = 42515]

29) What is the probability of getting 7 or 11 , when a pair of unbiased dice are tossed?

[Question ID = 25721]

1. 1/11 [Option ID = 42882]
2. 1/18 [Option ID = 42881]
3. 1/6 [Option ID = 42879]
4. 2/9 [Option ID = 42880]

Correct Answer :-

- 2/9 [Option ID = 42880]

30) An ideal sawtooth voltage waveform of frequency 500 Hz and amplitude 3V is generated by changing a capacitor of $2\mu\text{F}$ in every cycle. The charging requires [Question ID = 25663]

1. constant current source of 3mA for 2ms. [Option ID = 42650]
2. constant current source of mA for 1ms. [Option ID = 42649]
3. constant voltage source of 3V for 2ms. [Option ID = 42648]
4. constant voltage source of 3V for 1ms. [Option ID = 42647]

Correct Answer :-

- constant current source of 3mA for 2ms. [Option ID = 42650]

31) For $A=97$, which of the following elements is stable isobar? [Question ID = 25698]

1. ${}_{43}\text{Mo}^{97}$ [Option ID = 42789]
2. ${}_{42}\text{Mo}^{97}$ [Option ID = 42790]
3. ${}_{42}\text{Br}^{97}$ [Option ID = 42788]
4. ${}_{34}\text{Br}^{97}$ [Option ID = 42787]

Correct Answer :-

- ${}_{42}\text{Mo}^{97}$ [Option ID = 42790]

32) A PLL signal can be used to demodulate [Question ID = 25671]

1. DSB-SC signals [Option ID = 42682]
2. FM signals [Option ID = 42681]
3. PCM signals [Option ID = 42680]
4. PAM signals [Option ID = 42679]

Correct Answer :-

- FM signals [Option ID = 42681]

33) The critical angle for glass ($\mu_g=1.5$) immersed in oil ($\mu_o=1.1$) [Question ID = 25684]

1. $\varphi_c = \cot\left(\frac{11}{15}\right)$ [Option ID = 42734]
2. $\varphi_c = \sin^{-1}\left(\frac{11}{15}\right)$ [Option ID = 42731]
3. $\varphi_c = \cos^{-1}\left(\frac{11}{15}\right)$ [Option ID = 42732]
4. $\varphi_c = \tan^{-1}\left(\frac{11}{15}\right)$ [Option ID = 42733]

Correct Answer :-

- $\varphi_c = \sin^{-1}\left(\frac{11}{15}\right)$ [Option ID = 42731]

34) In these Questions keyword is followed by four choices. Choose the one nearest to it in meaning.

ETYMOLOGY

[Question ID = 25634]

1. Word derivation [Option ID = 42533]
2. Words [Option ID = 42534]
3. Ancient script [Option ID = 42531]
4. Foreign language [Option ID = 42532]

Correct Answer :-

- Word derivation [Option ID = 42533]

35) In these Questions keyword is followed by four choices. Choose the one nearest to it in meaning.

LOATH

[Question ID = 25633]

1. Unwilling [Option ID = 42528]
2. Sickly [Option ID = 42529]
3. Tired [Option ID = 42527]
4. Spirited [Option ID = 42530]

Correct Answer :-

- Unwilling [Option ID = 42528]

36) In the following items, some parts of the sentence have been jumbled up. You are required to rearrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence and mark in your answer sheet accordingly.

I came to India and

when I landed (P)/ two words of Hindi (Q) / I could speak, rather badly (R) / when I was twelve (S).

The correct sentence sequence should be

[Question ID = 25631]

1. PRSQ [Option ID = 42522]
2. SPRQ [Option ID = 42520]
3. RQPS [Option ID = 42519]
4. QSRP [Option ID = 42521]

Correct Answer :-

- SPRQ [Option ID = 42520]

37) In the following items, some parts of the sentence have been jumbled up. You are required to rearrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence and mark in your answer sheet accordingly.

Most people

not realizing how essential judicious exercise is (P)/ for good health (Q) / take next to no physical exercise (R)/ and are surprised when they fall ill (S).

The correct sequence should be

[Question ID = 25632]

1. RSPQ [Option ID = 42525]
2. QRSP [Option ID = 42526]
3. PQSR [Option ID = 42524]
4. PRSQ [Option ID = 42523]

Correct Answer :-

- RSPQ [Option ID = 42525]

38) The beta decay of the neutron is explicitly given by [Question ID = 25699]

1. $n \rightarrow p + e$ [Option ID = 42791]
2. $n \rightarrow p + e + \nu_s$ [Option ID = 42792]
3. $n \rightarrow p + e + \bar{\nu}_s$ [Option ID = 42793]
4. $n \rightarrow p + e + \gamma$ [Option ID = 42794]

Correct Answer :-

- $n \rightarrow p + e + \bar{\nu}_s$ [Option ID = 42793]

39) The number of distinct Boolean expressions of 4 variables is [Question ID = 25664]

1. 1024 [Option ID = 42653]
2. 65536 [Option ID = 42654]
3. 256 [Option ID = 42652]
4. 16 [Option ID = 42651]

Correct Answer :-

- 65536 [Option ID = 42654]

40) The number of different wavelengths which can be observed in the spectrum of a hydrogen sample whose atoms are excited to a state having principal quantum number n is [Question ID = 25692]

1. $\frac{n(n-1)}{2}$ [Option ID = 42763]

2. $\frac{n(n-1)}{4}$ [Option ID = 42765]

3. $\frac{n(n+1)}{4}$ [Option ID = 42766]

4. $\frac{n(n+1)}{2}$ [Option ID = 42764]

Correct Answer :-

• $\frac{n(n-1)}{2}$ [Option ID = 42763]

41) The number of bits in a binary PCM system is increased from n to $n+1$. As a result, the signal to quantization noise ratio will improve by a factor [Question ID = 25674]

1. $2^{2(n+1)/n}$ [Option ID = 42693]

2. $(n+1)/n$ [Option ID = 42691]

3. which is independent of n [Option ID = 42694]

4. $2^{(n+1)/n}$ [Option ID = 42692]

Correct Answer :-

• which is independent of n [Option ID = 42694]

42) Obtain the tangential component of the acceleration of a particle which is at a point $P(x,y)$ on the curve $x = e^t \cos t$,

$y = e^t \sin t$ at any time t .

[Question ID = 25717]

1. $\sqrt{3} e^{3t}$ [Option ID = 42866]

2. $\sqrt{2} e^t$ [Option ID = 42864]

3. $\sqrt{2} e^{2t}$ [Option ID = 42865]

4. e^t [Option ID = 42863]

Correct Answer :-

• $\sqrt{2} e^t$ [Option ID = 42864]

43) A committee of 4 members is to be appointed from 3 officers of the production department, 4 officers of the purchase department, 2 officers of the sales department and 1 chartered accountant. Find the probability of forming the committee which must include the chartered accountant. [Question ID = 25720]

1. 0.60 [Option ID = 42878]

2. 0.10 [Option ID = 42875]

3. 0.20 [Option ID = 42876]

4. 0.40 [Option ID = 42877]

Correct Answer :-

- 0.40 [Option ID = 42877]

44) The resolution of a 4-bit counting ADC is 0.5Volts. For an analog input of 6.6Volts, the digital output of the ADC will be [Question ID = 25667]

1. 1100 [Option ID = 42665]
2. 1110 [Option ID = 42666]
3. 1011 [Option ID = 42663]
4. 1101 [Option ID = 42664]

Correct Answer :-

- 1110 [Option ID = 42666]

45) Find the value of λ and μ so that the following equations

$$2x+3y+5z=9, 7x+3y-2z=8, 2x+3y+\lambda z= \mu$$

have no solution.

[Question ID = 25701]

1. $\lambda=5$, Any value of μ [Option ID = 42799]
2. $\lambda=5, \mu=9$ [Option ID = 42801]
3. $\lambda=5, \mu \neq 9$ [Option ID = 42800]
4. $\lambda \neq 5, \mu \neq 9$ [Option ID = 42802]

Correct Answer :-

- $\lambda=5, \mu \neq 9$ [Option ID = 42800]

46) Negative feedback in amplifiers [Question ID = 25661]

1. does not effect the signal to noise ratio at the output [Option ID = 42641]
2. improves the signal to noise ratio at the output [Option ID = 42640]
3. improves the signal to noise ratio at the input [Option ID = 42639]
4. increases the distortion [Option ID = 42642]

Correct Answer :-

- improves the signal to noise ratio at the output [Option ID = 42640]

47) A and B are two independent events such that $P(A)=0.6, P(A \cup B)=0.8$. Find $P(B)$ [Question ID = 25724]

1. $1/2$ [Option ID = 42893]
2. $1/3$ [Option ID = 42892]
3. $1/4$ [Option ID = 42891]
4. $1/5$ [Option ID = 42894]

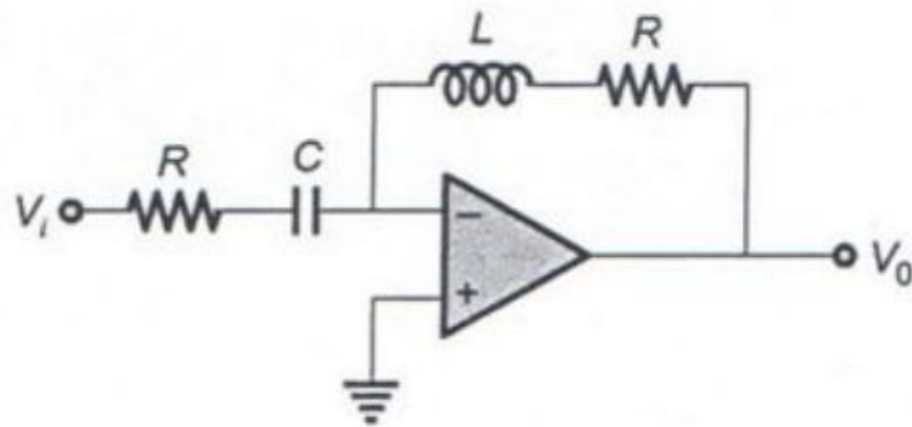
Correct Answer :-

- $1/2$ [Option ID = 42893]

48)

The Op-Amp shown in the following figure is ideal, $R = 1/\sqrt{L/C}$. The phase angle between V_0 and V_i , at

$\omega = 1/\sqrt{LC}$ is



[Question ID = 26447]

1. 2π [Option ID = 45786]
2. $3\pi/2$ [Option ID = 45785]
3. $\pi/2$ [Option ID = 45783]
4. π [Option ID = 45784]

Correct Answer :-

- $3\pi/2$ [Option ID = 45785]

49)

The probability that at least one of the events A and B occurs is 0.8 and the probability that both the events occur simultaneously is 0.25. Find the probability $P(\bar{A}) + P(\bar{B})$.

[Question ID = 25722]

1. 0.85 [Option ID = 42884]
2. 0.65 [Option ID = 42886]
3. 0.95 [Option ID = 42883]
4. 0.75 [Option ID = 42885]

Correct Answer :-

- 0.95 [Option ID = 42883]

50)

The majority carriers in an n-type semiconductor have an average drift velocity \vec{v} in a direction perpendicular to a uniform magnetic field \vec{B} . The electric field \vec{E} induced due to Hall effect acts in the direction

[Question ID = 25650]

1. along \vec{v} [Option ID = 42597]
2. along \vec{B} [Option ID = 42598]
3. $\vec{v} \times \vec{B}$ [Option ID = 42595]

4. $\vec{B} \times \vec{v}$ [Option ID = 42596]

Correct Answer :-

• $\vec{B} \times \vec{v}$ [Option ID = 42596]

51)

Evaluate the following

$$\lim_{x \rightarrow 0} \frac{e^x - 2 \cos x + e^{-x}}{x \sin x}$$

[Question ID = 25704]

1. 6 [Option ID = 42811]
2. 2 [Option ID = 42813]
3. zero [Option ID = 42814]
4. 4 [Option ID = 42812]

Correct Answer :-

- 2 [Option ID = 42813]

52)

A capacitor (parallel plate) is being charged at a constant rate $\frac{dQ}{dt} = b$. If A is the area of the plates and d is the separation between them, displacement current is

[Question ID = 25682]

1. b [Option ID = 42724]
2. $b\sqrt{A}/d$ [Option ID = 42726]
3. bd^2/A [Option ID = 42725]
4. bA/d^2 [Option ID = 42723]

Correct Answer :-

- b [Option ID = 42724]

53) The Eigen vectors of the matrix

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

are

[Question ID = 25702]

1. $[1,0,0]^T, [1,0,1]^T, [0,1,0]^T$ [Option ID = 42806]
2. $[1,0,0]^T, [0,0,1]^T, [0,1,0]^T$ [Option ID = 42805]

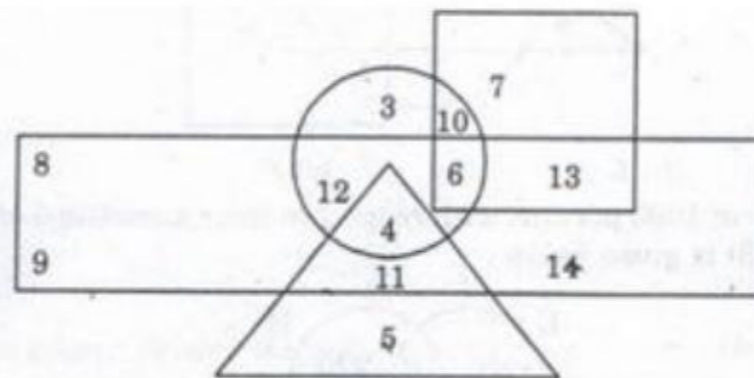
3. $[1,0,0]^T, [0,0,1]^T$ [Option ID = 42804]

4. $[1,0,0]^T$ [Option ID = 42803]

Correct Answer :-

• $[1,0,0]^T, [0,0,1]^T$ [Option ID = 42804]

54) Following questions are based on the diagram given below:



(1) Rectangle represents males

(2) Triangle represents educated

(3) Circle represents urban

(4) Square represents civil servants

Who among the following is uneducated and also an urban male?

[Question ID = 25646]

1. 11 [Option ID = 42581]

2. 2 [Option ID = 42579]

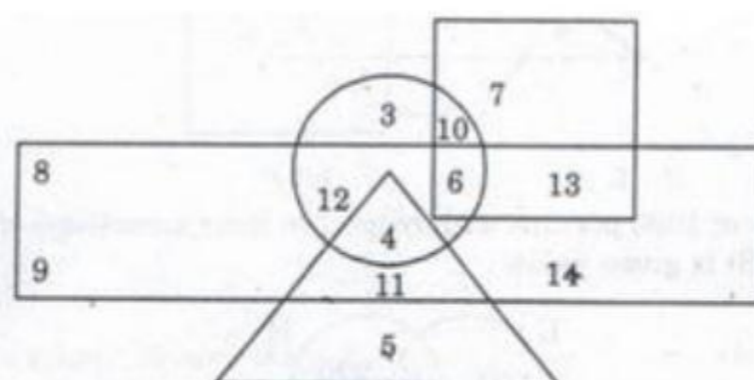
3. 12 [Option ID = 42582]

4. 3 [Option ID = 42580]

Correct Answer :-

• 12 [Option ID = 42582]

55) Following questions are based on the diagram given below:



(1) Rectangle represents males

(2) Triangle represents educated

(3) Circle represents urban

(4) Square represents civil servants

Who among the following is a female , urban resident and also a civil servant?

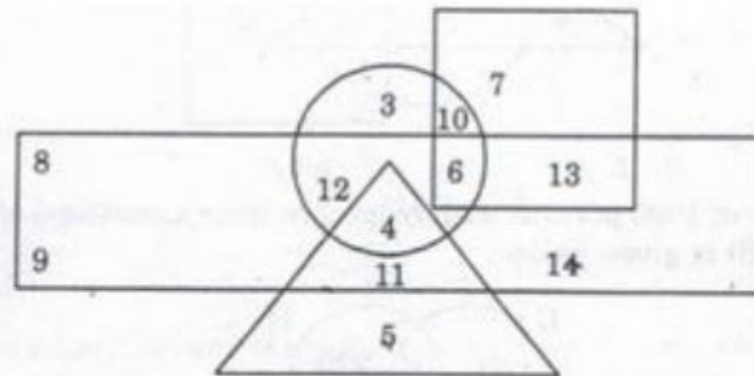
[Question ID = 25645]

1. 13 [Option ID = 42578]
2. 10 [Option ID = 42577]
3. 7 [Option ID = 42576]
4. 6 [Option ID = 42575]

Correct Answer :-

- 10 [Option ID = 42577]

56) Following questions are based on the diagram given below:



- (1) Rectangle represents males
- (2) Triangle represents educated
- (3) Circle represents urban
- (4) Square represents civil servants

Who among the following is an educated male who is not an urban resident?

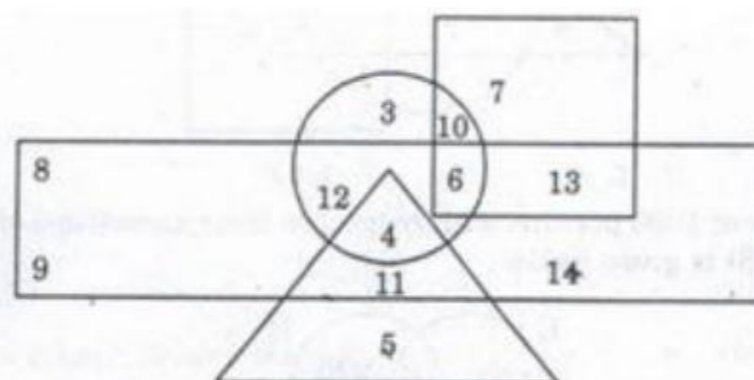
[Question ID = 25644]

1. 5 [Option ID = 42572]
2. 11 [Option ID = 42574]
3. 4 [Option ID = 42571]
4. 9 [Option ID = 42573]

Correct Answer :-

- 11 [Option ID = 42574]

57) Following questions are based on the diagram given below:



- (1) Rectangle represents males
- (2) Triangle represents educated
- (3) Circle represents urban
- (4) Square represents civil servants

Who among the following is a male , urban oriented and also a civil servant but not educated?

[Question ID = 25647]

1. 13 [Option ID = 42583]
2. 10 [Option ID = 42586]
3. 12 [Option ID = 42584]
4. 6 [Option ID = 42585]

Correct Answer :-

- 6 [Option ID = 42585]

58) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_{\sqrt{x^2+y^2}}^1 \frac{dx dy dz}{\sqrt{x^2+y^2+z^2}}$.

[Question ID = 25711]

1. $\frac{(\sqrt{2}+1)\pi}{4}$ [Option ID = 42839]
2. $\frac{(\sqrt{2}-1)\pi}{3}$ [Option ID = 42842]
3. $\frac{(\sqrt{2}+1)\pi}{3}$ [Option ID = 42841]
4. $\frac{(\sqrt{2}-1)\pi}{4}$ [Option ID = 42840]

Correct Answer :-

- $\frac{(\sqrt{2}-1)\pi}{4}$ [Option ID = 42840]

59) Solve the initial value problem $\cos x \frac{dy}{dx} + y = \sin x, y(0) = 2$.

[Question ID = 25714]

1. $y = 1 + \frac{(1+x)\cos x}{1-\sin x}, \sin x \neq -1$. [Option ID = 42852]
2. $y = 1 - \frac{(1+x)\cos x}{1+\sin x}, \sin x \neq -1$. [Option ID = 42854]
3. $y = 1 + \frac{(1-x)\cos x}{1+\sin x}, \sin x \neq -1$. [Option ID = 42853]
4. $y = 1 + \frac{(1+x)\cos x}{1+\sin x}, \sin x \neq -1$. [Option ID = 42851]

Correct Answer :-

- $y = 1 + \frac{(1-x)\cos x}{1+\sin x}, \sin x \neq -1$. [Option ID = 42853]

60) Evaluate $I = \int_0^{\pi/2} \ln \sin x dx$

[Question ID = 25708]

1. $I = \frac{\pi}{2} \ln 3$ [Option ID = 42829]
2. $I = -\frac{\pi}{2} \ln 2$ [Option ID = 42828]
3. $I = \frac{\pi}{2} \ln 2$ [Option ID = 42827]
4. $I = -\frac{\pi}{2} \ln 3$ [Option ID = 42830]

Correct Answer :-

- $I = -\frac{\pi}{2} \ln 2$ [Option ID = 42828]

61) The value of A for $\psi = A \cos^2 x$ for $-\pi/2 < x < \pi/2$ is

[Question ID = 25685]

1. $\sqrt{\frac{3}{5\pi}}$ [Option ID = 42738]
2. $\sqrt{\frac{5}{3\pi}}$ [Option ID = 42737]
3. $\sqrt{\frac{8}{3\pi}}$ [Option ID = 42735]
4. $\sqrt{\frac{3}{8\pi}}$ [Option ID = 42736]

Correct Answer :-

- $\sqrt{\frac{8}{3\pi}}$ [Option ID = 42735]

62) Solve the differential equation $\frac{dy}{dx} = \frac{y-x+1}{y-x+5}$

[Question ID = 25713]

1. $(y-x)^2 + 10(y-x) + 8x = c$, c is a constant. [Option ID = 42848]
2. $(y-x)^2 + 10(y-x) - 8x = c$, c is a constant. [Option ID = 42849]
3. $(y-x)^2 - 10(y-x) + 8x = c$, c is a constant. [Option ID = 42847]
4. $(y-x)^2 - 10(y-x) - 8x = c$, c is a constant. [Option ID = 42850]

Correct Answer :-

- $(y-x)^2 + 10(y-x) + 8x = c$, c is a constant. [Option ID = 42848]

63) Find the area bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ using the double integration.

[Question ID = 26446]

1. $4/\pi ab$ [Option ID = 45781]

2. $\pi_{ab}/2$ [Option ID = 45782]
3. $\pi_{ab}/4$ [Option ID = 45780]
4. π_{ab} [Option ID = 45779]

Correct Answer :-

- π_{ab} [Option ID = 45779]

64)

Find $\frac{df}{dt}$ at $t = 0$, if $f(x, y, z) = x^3 + xz^2 + y^3 + xyz$, $x = e^t, y = \cos t, z = t^3$.

[Question ID = 25707]

1. 2 [Option ID = 42824]
2. 1 [Option ID = 42823]
3. 3 [Option ID = 42825]
4. 4 [Option ID = 42826]

Correct Answer :-

- 3 [Option ID = 42825]

65) If $f = x^2 + y^2 + z^2$ and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then $\nabla \cdot (f\vec{r})$ equals

[Question ID = 25718]

1. f [Option ID = 42867]
2. $2f$ [Option ID = 42868]
3. $4f$ [Option ID = 42869]
4. $5f$ [Option ID = 42870]

Correct Answer :-

- $5f$ [Option ID = 42870]

66)

Calculate $\iint_R \frac{\sin x}{x} dA$ over a region R which is a triangle in the xy -plane bounded by the x -axis, the line $y = x$ and the line $x = 1$.

[Question ID = 25709]

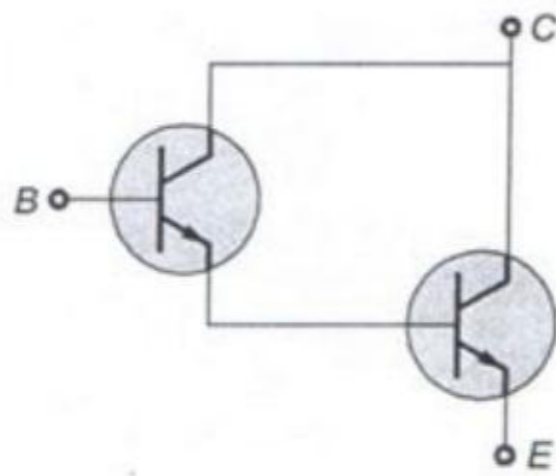
1. $1 - \sin 1$ [Option ID = 42831]
2. $1 + \sin 1$ [Option ID = 42833]
3. $1 - \cos 1$ [Option ID = 42834]
4. $1 + \cos 1$ [Option ID = 42832]

Correct Answer :-

- $1 - \cos 1$ [Option ID = 42834]

67)

Each transistor in the Darlington pair (shown below) has $h_{FE} = 100$. The overall h_{FE} of the composite transistor neglecting the leakage current is



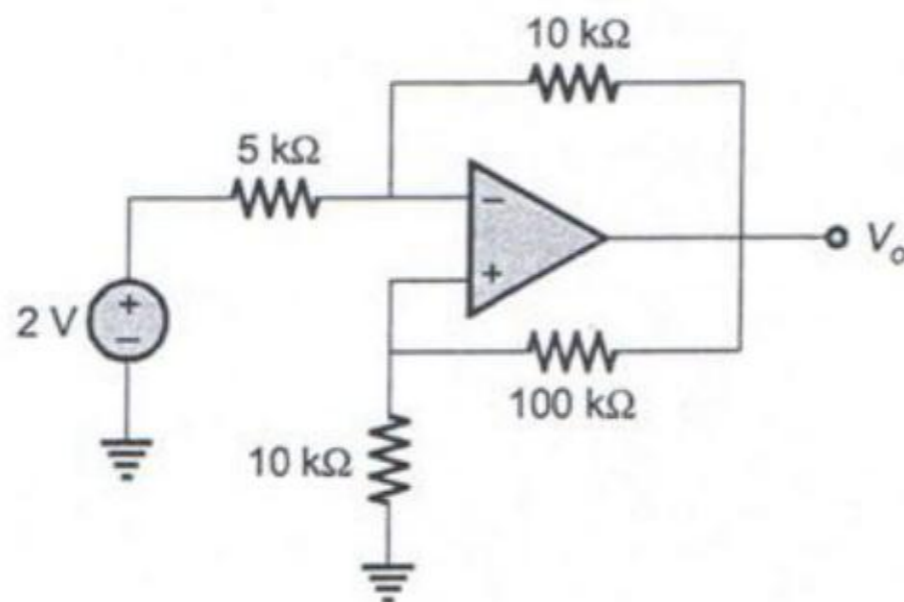
[Question ID = 25659]

1. 10001 [Option ID = 42632]
2. 10000 [Option ID = 42631]
3. 10200 [Option ID = 42634]
4. 10100 [Option ID = 42633]

Correct Answer :-

- 10100 [Option ID = 42633]

68) The output voltage V_o of the circuit shown below is



[Question ID = 25657]

1. -4V [Option ID = 42623]
2. 6V [Option ID = 42624]
3. - 5.5 V [Option ID = 42626]
4. 5V [Option ID = 42625]

Correct Answer :-

- - 5.5 V [Option ID = 42626]

69)

Find the basis of the subspace if $\vec{u} = \{(a, b, c, d)\}$, such that $a + c + d = 0, b + d = 0$, be a subspace of \mathbb{R}^4

[Question ID = 25700]

1. $\{(-1-1 \ 0 \ 1), (-1 \ 0 \ 1 \ 0)\}$ [Option ID = 42795]

2. $\{(-1-1\ 0\ 1),(-1\ 0\ -1\ 0)\}$ [Option ID = 42797]
3. $\{(-1-1\ 0\ -1),(-1\ 0\ -1\ 0)\}$ [Option ID = 42798]
4. $\{(-1\ 1\ 0\ 1),(-1\ 0\ 1\ 0)\}$ [Option ID = 42796]

Correct Answer :-

- $\{(-1-1\ 0\ 1),(-1\ 0\ 1\ 0)\}$ [Option ID = 42795]

70)

If $\vec{F} = (5xy - 6x^2)\hat{i} + (2y - 4x)\hat{j}$, evaluate $\int \vec{F} \cdot d\vec{r}$ over a curve $C: y = x^3$ in the xy -plane from the point $(1,1)$ to $(2,8)$.

[Question ID = 25719]

1. 35 [Option ID = 42874]
2. 5 [Option ID = 42871]
3. 20 [Option ID = 42873]
4. 10 [Option ID = 42872]

Correct Answer :-

- 35 [Option ID = 42874]

71)

A conducting sphere of radius R is placed on a uniform electric field \vec{E}_0 directed along $+z$ -axis. The electric potential for outside points is given as

$$V_{out} = -E_0 \left(1 - \frac{R^3}{r^3} \right) r \cos \theta$$

Where r is the distance from the centre and θ is the polar angle. The charge density on the surface of the sphere is

[Question ID = 25680]

1. $-3\varepsilon_0 E_0 \cos \theta$ [Option ID = 42717]
2. $\varepsilon_0 E_0 \cos \theta$ [Option ID = 42716]
3. $3\varepsilon_0 E_0 \cos \theta$ [Option ID = 42715]
4. $\varepsilon_0 E_0 \cos \theta / 3$ [Option ID = 42718]

Correct Answer :-

- $3\varepsilon_0 E_0 \cos \theta$ [Option ID = 42715]

72) Solve the differential equation $(D^2 + 3D + 2)y = e^{e^x}$.

[Question ID = 25716]

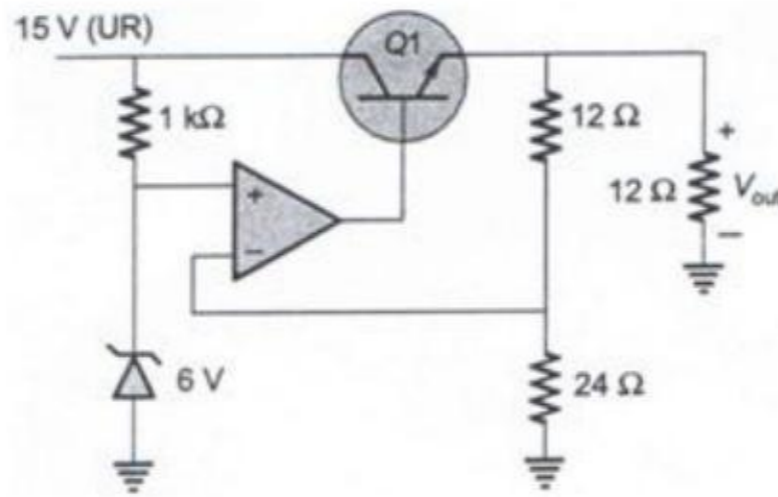
1. $y(x) = c_1 e^{-x} + c_2 e^{2x} + e^{(e^x - 2x)}$; c_1, c_2 are constants. [Option ID = 42861]
2. $y(x) = c_1 e^{-x} + c_2 e^{-2x} + e^{(e^{-x} - 2x)}$; c_1, c_2 are constants. [Option ID = 42862]
3. $y(x) = c_1 e^{-x} + c_2 e^{-2x} + e^{(e^x - 2x)}$; c_1, c_2 are constants. [Option ID = 42859]

4. $y(x) = c_1 e^x + c_2 e^{-2x} + e^{(e^x - 2x)}$; c_1, c_2 are constants. [Option ID = 42860]

Correct Answer :-

- $y(x) = c_1 e^{-x} + c_2 e^{-2x} + e^{(e^x - 2x)}$; c_1, c_2 are constants. [Option ID = 42859]

- 73) A regulated power supply, shown in figure below, has an unregulated input (UR) of 15Volts and generates a regulated output V_{out} . Use the component values shown in the figure.



The power dissipation across the transistor shown in the figure is [Question ID = 25658]

1. 4.8 Watts [Option ID = 42627]
2. 6.0 Watts [Option ID = 42630]
3. 5.0 Watts [Option ID = 42628]
4. 5.4 Watts [Option ID = 42629]

Correct Answer :-

- 6.0 Watts [Option ID = 42630]

74)

Events E and F are given to be independent. Find $P(F)$ if it is given that $P(E) = 0.4$ and $P(E \cup F) = 0.55$.

[Question ID = 25723]

1. $1/32$ [Option ID = 42889]
2. $1/64$ [Option ID = 42890]
3. $1/16$ [Option ID = 42888]
4. $1/4$ [Option ID = 42887]

Correct Answer :-

- $1/4$ [Option ID = 42887]

- 75) The inclined asymptote of the curve is $y = \frac{x^2}{\sqrt{x^2 - 4}}$ are

[Question ID = 25706]

1. $y=x^2, y=-x^2$ [Option ID = 42822]
2. $y=x, y=-x$ [Option ID = 42820]
3. $2y=x, y=-2x$ [Option ID = 42821]

4. $x=2$ [Option ID = 42819]

Correct Answer :-

- $y=x, y=-x$ [Option ID = 42820]

76) The Lagrangian for a system of three particles is

$$L = \frac{1}{2}(\dot{q}_1^2 + \dot{q}_2^2 + \dot{q}_3^2) - a^2(q_1^2 + q_2^2 + q_3^2 - q_1q_3)$$

One of the Eigen frequencies is given by

[Question ID = 25677]

1. $\omega^2 = 2a^2$ [Option ID = 42705]
2. $\omega^2 = 5a^2$ [Option ID = 42703]
3. $\omega^2 = a^2/2$ [Option ID = 42704]
4. $\omega^2 = \sqrt{2a^2}$ [Option ID = 42706]

Correct Answer :-

- $\omega^2 = 2a^2$ [Option ID = 42705]

77) Each of the following items consists of a sentence followed by four words or groups of words. Select the antonym of the word or words (occurring in the sentence in capital letters) as per the context.

The **CONFRONTATION** between the two parties could not be averted.

[Question ID = 25627]

1. Agreement [Option ID = 42506]
2. Friendship [Option ID = 42503]
3. Angry disagreement [Option ID = 42504]
4. Reconstitution [Option ID = 42505]

Correct Answer :-

- Agreement [Option ID = 42506]

78) Each of the following items consists of a sentence followed by four words or groups of words. Select the antonym of the word or words (occurring in the sentence in capital letters) as per the context.

People **GATHERED** at his shop.

[Question ID = 25628]

1. Disappeared [Option ID = 42509]
2. Spread [Option ID = 42508]
3. Cleared [Option ID = 42510]
4. Dispersed [Option ID = 42507]

Correct Answer :-

- Dispersed [Option ID = 42507]

79) Each of the following items consists of a sentence followed by four words or groups of words. Select the synonym of the word (occurring in the sentence in capital letters) as per the context.

The Minister's **ITINERARY** has not been announced yet.

[Question ID = 25625]

1. Venue of meeting [Option ID = 42498]
2. Series of lectures [Option ID = 42496]
3. Topic of discussion [Option ID = 42497]
4. Detailed route [Option ID = 42495]

Correct Answer :-

- Detailed route [Option ID = 42495]

80) Each of the following items consists of a sentence followed by four words or groups of words. Select the synonym of the word (occurring in the sentence in capital letters) as per the context.

He was **INFURIATED** by the maddening behavior of the clerk at the post office.

[Question ID = 25626]

1. Pacified [Option ID = 42501]
2. Depressed [Option ID = 42502]
3. Enraged [Option ID = 42500]
4. Disgusted [Option ID = 42499]

Correct Answer :-

- Enraged [Option ID = 42500]

81) Find the surface area of solid generated by revolving the circle $x^2 + (y-b)^2 = a^2, b \geq a$ about the x-axis. [Question ID = 25705]

1. $4\pi^2 ab$ [Option ID = 42816]
2. $4\pi^2 \left(\frac{a}{b}\right)$ [Option ID = 42817]
3. $4\pi^2 (b/a)$ [Option ID = 42818]
4. $2\pi^2 ab$ [Option ID = 42815]

Correct Answer :-

- $4\pi^2 ab$ [Option ID = 42816]

82) Consider a satellite going around the earth in a circular orbit at a height of $2R$ from the surface of the earth, where R is the radius of the earth. What is the speed of the satellite?

[Question ID = 25676]

1. $gR/3$ [Option ID = 42699]
2. $gR/2$ [Option ID = 42702]
3. $(gR/2)^{(1/2)}$ [Option ID = 42701]

4. $(gR/3)^{(1/2)}$ [Option ID = 42700]

Correct Answer :-

- $(gR/3)^{(1/2)}$ [Option ID = 42700]

83) A Carnot's engine whose sink is at a temperature of 300K has an efficiency of 40%. By how much should the temperature of the source be increased so as to increase the efficiency to 60%. [Question ID = 25688]

1. 325K [Option ID = 42747]
2. 275K [Option ID = 42748]
3. 300K [Option ID = 42750]
4. 250K [Option ID = 42749]

Correct Answer :-

- 250K [Option ID = 42749]

84) A sentence has been broken into four parts. Choose the part that has an error.

[Question ID = 25635]

1. torpedoed by a rogue submarine [Option ID = 42537]
2. It was on that particular ill-fated [Option ID = 42535]
3. and sunk with all hands. [Option ID = 42538]
4. voyage that a Lusitania was [Option ID = 42536]

Correct Answer :-

- voyage that a Lusitania was [Option ID = 42536]

85) A sentence has been broken into four parts. Choose the part that has an error.

[Question ID = 25636]

1. follow him into the office. [Option ID = 42542]
2. request from the man with keys to [Option ID = 42541]
3. touch in the shoulder , and a [Option ID = 42540]
4. He was roused by a [Option ID = 42539]

Correct Answer :-

- touch in the shoulder , and a [Option ID = 42540]

86) In a Zener diode [Question ID = 25652]

1. only the N-region is heavily doped. [Option ID = 42604]
2. only the P-region is heavily doped. [Option ID = 42603]
3. Both P and N –regions are heavily doped. [Option ID = 42605]
4. Both P and N –regions are lightly doped. [Option ID = 42606]

Correct Answer :-

- Both P and N –regions are heavily doped. [Option ID = 42605]

87) Which of the following is true? [Question ID = 25651]

1. A silicon wafer lightly doped with arsenic is a p^+ substrate [Option ID = 42602]

2. A silicon wafer lightly doped with boron is a p^+ substrate [Option ID = 42600]
3. A silicon wafer heavily doped with boron is a p^+ substrate [Option ID = 42599]
4. A silicon wafer heavily doped with arsenic is a p^+ substrate [Option ID = 42601]

Correct Answer :-

- A silicon wafer heavily doped with boron is a p^+ substrate [Option ID = 42599]

88) Read each sentence to find if there is any grammatical error in it. If there is any error, it will be only in one part of the sentence. The number or alphabet of that part is your answer. (Disregard punctuation errors, if any)

One should (A)/ always (B)/ take care (C)/ of his health.(D)

[Question ID = 25639]

1. D [Option ID = 42554]
2. B [Option ID = 42552]
3. A [Option ID = 42551]
4. C [Option ID = 42553]

Correct Answer :-

- D [Option ID = 42554]

89) Read each sentence to find if there is any grammatical error in it. If there is any error, it will be only in one part of the sentence. The number or alphabet of that part is your answer. (Disregard punctuation errors, if any)

They appointed (A)/ him as a manager (B)/ as he is (C)/ efficient. (D)

[Question ID = 25637]

1. D [Option ID = 42546]
2. B [Option ID = 42544]
3. A [Option ID = 42543]
4. C [Option ID = 42545]

Correct Answer :-

- B [Option ID = 42544]

90) Read each sentence to find if there is any grammatical error in it. If there is any error, it will be only in one part of the sentence. The number or alphabet of that part is your answer. (Disregard punctuation errors, if any)

The prices of (A)/ his article (B)/ considerably varies (C)/ in different parts of the country.(D)

[Question ID = 25638]

1. D [Option ID = 42550]
2. B [Option ID = 42548]
3. A [Option ID = 42547]
4. C [Option ID = 42549]

Correct Answer :-

- A [Option ID = 42547]

91) Boolean expression for the output of XNOR (equivalence) logic gate with inputs A and B is [Question ID = 25665]

1. $A\bar{B} + \bar{A}B$ [Option ID = 42655]
2. $\bar{A}\bar{B} + AB$ [Option ID = 42656]
3. $(\bar{A} + \bar{B})(A + B)$ [Option ID = 42658]
4. $(\bar{A} + B)(\bar{A} + \bar{B})$ [Option ID = 42657]

Correct Answer :-

- $\bar{A}\bar{B} + AB$ [Option ID = 42656]

92) The transit time of the current carries through the channel of a JFET decides its characteristics. [Question ID = 25655]

1. GATE [Option ID = 42617]
2. Source and drain [Option ID = 42618]
3. Source [Option ID = 42615]
4. Drain [Option ID = 42616]

Correct Answer :-

- Drain [Option ID = 42616]

93) Let $f(x)$ be a real valued function which is continuous on a closed interval $[a,b]$ and differentiable in the open interval (a,b) . Then there exists one value c , $a < c < b$, such that

[Question ID = 25703]

1. $f'(c) = \frac{(f(b) * f(a))}{(b - a)}$ [Option ID = 42809]
2. $f'(c) = \frac{(f(a) - f(b))}{(b - a)}$ [Option ID = 42808]
3. $f'(c) = \frac{(f(b) - f(a))}{(b - a)}$ [Option ID = 42810]
4. $f'(c) = \frac{f(a)}{(b - a)}$ [Option ID = 42807]

Correct Answer :-

- $f'(c) = \frac{(f(b) - f(a))}{(b - a)}$ [Option ID = 42810]

94) The message bit sequence to a DPSK modulator is 1, 1, 0, 0, 1, 1. The carrier phase during the reception of the first two message bits is π, π . The carrier phase for the remaining four message bits is

[Question ID = 26445]

1. $0, \pi, \pi, \pi$ [Option ID = 45777]
2. $\pi, \pi, 0, 0$ [Option ID = 45778]

3. $\pi, \pi, 0, \pi$ [Option ID = 45775]

4. $0, 0, \pi, \pi$ [Option ID = 45776]

Correct Answer :-

• $0, \pi, \pi, \pi$ [Option ID = 45777]

95) The differential equation corresponding to the system $x=A \cos(pt- a)$ is

[Question ID = 25712]

1. $x \frac{d^3x}{dt^3} - \frac{d^2x}{dt^2} = 0$ [Option ID = 42843]

2. $x \frac{d^3x}{dt^3} - \left(\frac{dx}{dt}\right) \frac{d^2x}{dt^2} = 0$ [Option ID = 42844]

3. $\frac{d^3x}{dt^3} - \left(\frac{dx}{dt}\right) \frac{d^2x}{dt^2} = 0$ [Option ID = 42845]

4. $\left(\frac{dx}{dt}\right) \frac{d^3x}{dt^3} - x \frac{d^2x}{dt^2} = 0$ [Option ID = 42846]

Correct Answer :-

• $x \frac{d^3x}{dt^3} - \left(\frac{dx}{dt}\right) \frac{d^2x}{dt^2} = 0$ [Option ID = 42844]

96) The diffusion potential across a pn-junction

[Question ID = 25653]

1. increases with decreasing band gap [Option ID = 42608]
2. increases with increase in doping concentration [Option ID = 42610]
3. decreases with increasing doping concentration [Option ID = 42607]
4. does not depend on doping concentration [Option ID = 42609]

Correct Answer :-

• increases with increase in doping concentration [Option ID = 42610]

97) An alpha particle of energy 5MeV is scattered through 180° by a fixed uranium nucleus. The distance of closest approach is of the order of [Question ID = 25694]

1. 10^{-15} cm [Option ID = 42774]

2. 10^{-10} cm [Option ID = 42772]

3. 10^{-12} cm [Option ID = 42773]

4. 1 \AA [Option ID = 42771]

Correct Answer :-

• 10^{-12} cm [Option ID = 42773]

98) A particular green LED emits light of wavelength 5490 \AA . The energy bandgap of the semiconductor material used there is (Planck's constant = 6.626×10^{-34} J-s) [Question ID = 25654]

1. 2.26eV [Option ID = 42611]

2. 1.17eV [Option ID = 42613]
3. 1.98eV [Option ID = 42612]
4. 0.74eV [Option ID = 42614]

Correct Answer :-

- 2.26eV [Option ID = 42611]

99) A photon of energy 8eV is incident on a metal surface of threshold frequency 1.6×10^{15} Hz. The kinetic energy (in eV) of the photoelectron emitted is (take $h = 6 \times 10^{-34}$ Js) [Question ID = 25691]

1. 6 [Option ID = 42759]
2. 2 [Option ID = 42760]
3. 1.2 [Option ID = 42762]
4. 1.6 [Option ID = 42761]

Correct Answer :-

- 2 [Option ID = 42760]

100) The first ring of a zone plate has a diameter of 1.1mm. Plane waves fall on the plate and produce the brightest focused spot on a screen placed at a distance of 300 cm. Calculate the wavelength of the source used. [Question ID = 25690]

1. 4000 Å [Option ID = 42755]
2. 4033 Å [Option ID = 42756]
3. 4099 Å [Option ID = 42758]
4. 4066 Å [Option ID = 42757]

Correct Answer :-

- 4033 Å [Option ID = 42756]