# DSSSB AE (E&M)

## Previous Year Paper

### 8 March 2022 Shift 1

GOVT. OF NCT OF DELHI
Delhi Subordinate Services Selection Board
FC-18, Institutional Area, Karkardooma, Delhi – 110092.
www.dsssb.delhigovt.nic.in

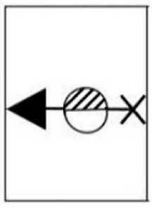
| | |
|---|---|
| Participant ID | |
| Participant Name | |
| Test Center Name | |
| Test Date | 08/03/2022 |
| Test Time | 8:30 AM - 10:30 AM |
| Subject | Assistant Engineer (E and M) |

Section : Mental Ability

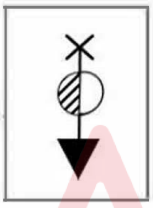
Q.1 Choose the figure which different from the rest of the figures given below

Ans

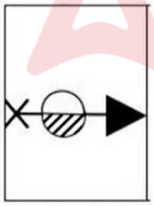
✗ A.



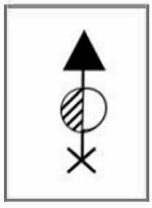
✗ B.



✗ C.



✓ D.



Question ID : 60092914805

**Q.2** In the coded language if, MEDICINE is written as EOJDJEFM then which of the following will be the coded form of COMPUTER

**Ans**

✗ A. RUFNPVQC

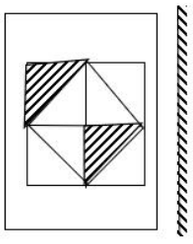
✗ B. RUFVQNPC

✓ C. RFUVQNPC

✗ D. RFUPNQVC

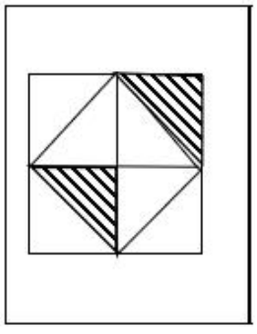
Question ID : **60092914794**

**Q.3** Select the figure from the figures given as options which is the mirror image of the given figure.

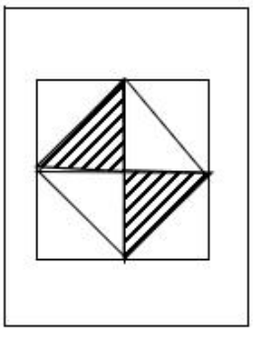


**Ans**

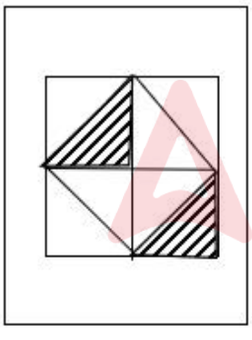
✔ A.



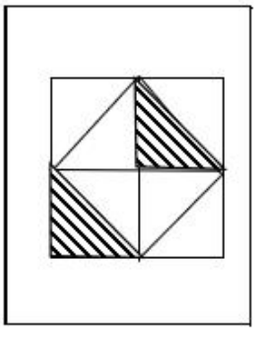
✘ B.



✘ C.



✘ D.



Question ID : **60092914806**

**Q.4** Select the option that is related to the third number in the same way as the second number is related to the first number.

60:20::3:?

**Ans**

✗ A. 6

✗ B. 9

✓ C. 1

✗ D. 2

Question ID : **60092914799**

**Q.5** If Jeevan is in the East of Urmila who is in the North of Priya. If Rohan is in the South of Priya, then in which direction of Jeevan, is Rohan?

**Ans**

✓ A. North

✗ B. South-East

✗ C. West

✗ D. South

Question ID : **60092914795**

**Q.6** Four words have been given, out of which three are alike in some manner and one is different. Select the one that is different.

**Ans**

✗ A. Hammer

✗ B. Spanner

✗ C. Screw Driver

✓ D. Bolt

Question ID : **60092914801**

**Q.7** The examination report card of Mr Anil Yadav shows that his rank is 20th among 80 students. What will be his rank from the bottom of the rank list?

**Ans**

✓ A. 61

✗ B. 62

✗ C. 59

✗ D. 60

Question ID : **60092914791**

**Q.8** Four words have been given, out of which three are alike in some manner and one is different. Select the one that is different.

**Ans**

✗ A. Rat

✓ B. Hat

✗ C. Bat

✗ D. Cat

Question ID : **60092914802**

Q.9 संचार : केट ::_____: गेट (Communicate : Cate ::_____: Gate)

Ans
✗ A. दरवाजा (Door)
✓ B. भड़काना (Instigate)
✗ C. खिड़की (Window)
✗ D. प्रोत्साहित करना (Motivate)

Question ID : **60092914798**

Q.10 In a code language, CNNQ = 84, KNVDQ=86, SNVDQ=67, then NUDQ =?

Ans
✗ A. 06
✗ B. 81
✓ C. 65
✗ D. 45

Question ID : **60092914793**

Q.11 मोहिता, जनक के साथ जा रही थी और तृप्ता ने उससे जनक और मोहिता के रिश्ते के बारे में पूछा। मोहिता ने जवाब दिया, "मेरे चाचा और उसके मामा के चाचा एक ही हैं। मोहिता का जनक के साथ क्या संबंध है।

Ans
✗ A. माँ और बेटे का
✗ B. चाची और बेटे का
✗ C. पोता और दादी का
✓ D. चाची और भतीजे का

Question ID : **60092914797**

Q.12 निम्नलिखित जानकारी को ध्यानपूर्वक पढ़ें और उसके बाद दिए गए प्रश्नों के उत्तर दें। अमृत, भास्कर, चित्रा, दया, एकता, फलक, गणेश और हरि एक परिवार के आठ सदस्य हैं और वे एक गोल मेज के परित: बैठे हैं, लेकिन इसी क्रम में नहीं हैं। उनमें से चार मेज के केंद्र की ओर अभिमुख होकर बैठे हैं और चार बाहर की ओर अभिमुख होकर बैठे हैं। उनके बैठने के क्रम का विवरण इस प्रकार है:
1. एकता बाहर की ओर अभिमुख है, एकता के दोनों पड़ोसी केंद्र की ओर अभिमुख हैं। हरि, एकता के दाएं दूसरे स्थान पर बैठा है। भास्कर, एकता के बाएं तीसरे स्थान पर बैठा है।
2. दया केंद्र की ओर अभिमुख है और उसके दोनों पड़ोसी बाहर की ओर अभिमुख हैं।
3. गणेश, अमृत के बाएं दूसरे स्थान पर बैठा है। भास्कर, हरि के दाएं तीसरे स्थान पर बैठा है।
4. फलक, दया के पड़ोस में है। चित्रा, गणेश की पड़ोसी है।
5. दया, भास्कर का पड़ोसी नहीं है।
निम्नलिखित में से कौन फलक और चित्रा के बीच में बैठा है?

Ans
✗ A. अमृत
✓ B. भास्कर
✗ C. गणेश
✗ D. एकता

Question ID : **60092914790**

**Q.13** Find out the odd numeral pair from the given options

**Ans**
- ✔ A. 442-124
- ✘ B. 423-129
- ✘ C. 333-133
- ✘ D. 343-123

Question ID : **60092914808**

**Q.14** Select the option that is related to the third word in the same way as the second word is related to the first word.

Continent: Asia:: _____: Indian Ocean

**Ans**
- ✘ A. South Pole
- ✘ B. Pacific Ocean
- ✔ C. Ocean
- ✘ D. Sea

Question ID : **60092914800**

**Q.15** If A stands for 'addition', B stands for 'subtraction', C stands for 'multiplication' and D stands for 'division', then 20 A 8 B 8 C 4 D 2 ?

**Ans**
- ✘ A. 11
- ✔ B. 12
- ✘ C. 13
- ✘ D. 14

Question ID : **60092914809**

**Q.16** Please read and understand the following statement carefully and find which one of the conclusions is true

Statement: R = F, P ≥ R, W < P

Conclusion I: P ≤ F

Conclusion II: F > W

**Ans**
- ✘ A. Neither conclusion I nor II is true
- ✘ B. Only conclusion I is true
- ✔ C. Only conclusion II is true
- ✘ D. Both conclusion I and II are true

Question ID : **60092914792**

**Q.17** Select the next correct number from the alternatives given as option that will continue the same pattern and replace the question mark in the given series.

5, 6, 10, 19, 35, ?

**Ans**

✗ A. 81

✓ B. 60

✗ C. 74

✗ D. 64

Question ID : **60092914807**

**Q.18** From the given letter sets, all are alike in some manner and one is different. Select the one that is different.

**Ans**

✗ A. TU

✗ B. DE

✓ C. MO

✗ D. PQ

Question ID : **60092914804**

**Q.19** After carefully reading and understanding the following information, answer the question given at the end of information:

If 'P × Q' means 'P is father of Q'.

If 'P + Q' means 'P is wife of Q'.

If 'P ÷ Q' means 'P is daughter of Q'.

If 'P – Q' means 'P is son of Q'.

How is L related to N in the expression 'L ÷ M × O – A + N'?

**Ans**

✗ A. Grandmother

✗ B. Daughter

✓ C. Granddaughter

✗ D. Mother

Question ID : **60092914796**

**Q.20** From the given letter sets, all are alike in some manner and one is different. Select the one that is different.

**Ans**

✗ A. ON

✗ B. TS

✓ C. PQ

✗ D. GF

Question ID : **60092914803**

Section : **General Awareness**

Q.1 Who is the present Union Minister of Power and New & Renewable Energy?

Ans
✔ A. Shri R. K. Singh
✘ B. Shri Ashish Upadhyaya
✘ C. Shri Alok Kumar
✘ D. Shri Krishan Pal

Question ID : **60092914820**

Q.2 निम्नलिखित में से कौन सा स्तूप उस स्थान पर निर्मित है, जहां बुद्ध पंचवर्गीय भिक्षुओं, अपने पांच साथियों से पुन:मिले थे, जो पहले राजगीर में उनसे बिछड़ गए थे?

Ans
✘ A. महाबोधि स्तूप
✘ B. अमरावती स्तूप
✘ C. केसरिया स्तूप
✔ D. चौखंडी स्तूप

Question ID : **60092914814**

Q.3 The Indian Air Force and French Air and Space Force participated in Ex Desert Knight 2021 at:

Ans
✘ A. Air Force Station, Jorhat
✘ B. Air Force Station, Madurai
✔ C. Air Force Station, Jodhpur
✘ D. Air Force Station, Nagpur

Question ID : **60092914813**

Q.4 FIFA महिला विश्व कप का आयोजन _____ किया जाता है।

Ans
✘ A. प्रति वर्ष
✔ B. प्रति चार वर्षों में
✘ C. प्रति दो वर्षों में
✘ D. प्रति तीन वर्षों में

Question ID : **60092914826**

Q.5 Who is the author of the book 'Raj Kapoor: The Master At Work' which was launched at India Habitat Centre in New Delhi by Vice President of India, M Venkaiah Naidu in December 2021?

Ans
✘ A. Dr. Rekha Chaudhari
✘ B. S. S. Oberoi
✔ C. Rahul Rawail
✘ D. Dr. Shashi Tharoor

Question ID : **60092914811**

Q.6 In which year, Microfinance Institutions Network (MFIN) was recognised by the Reserve Bank of India (RBI) as India's first Self-Regulatory Organization (SRO) for the Non-Banking Financial Companies - Microfinance Institutions (NBFC-MFIs)?

Ans
✗ A. 2012
✗ B. 2010
✗ C. 2013
✓ D. 2014

Question ID : **60092914821**

Q.7 Which of the following bills is NOT yet passed in parliament as of 23rd December 2021?

Ans
✗ A. The Narcotic Drugs and Psychotropic Substances (Amendment) Bill, 2021
✗ B. The Election Laws (Amendment) Bill, 2021
✗ C. The High Court and Supreme Court Judges (Salaries and Conditions of Service) Amendment Bill, 2021
✓ D. The Prohibition of Child Marriage (Amendment) Bill, 2021

Question ID : **60092914812**

Q.8 In order to become a Member of Vidhan Sabha a person:

Ans
✓ A. his/her name must be in voters' list
✗ B. cannot apply after 55 years
✗ C. must have attained the age of 18 years
✗ D. must be a government servant

Question ID : **60092914824**

Q.9 Which of the following Institutes has been awarded the top position under the most innovative research institutions category by the Confederation of Indian Industry (CII)?

Ans
✗ A. The Indian Institute of Technology, Kharagpur
✗ B. The Indian Institute of Technology, Hyderabad
✗ C. The Indian Institute of Technology, Guwahati
✓ D. The Indian Institute of Technology, Roorkee

Question ID : **60092914810**

Q.10 The name king Kadungon is associated with _____.

Ans
✗ A. The Pallavas
✗ B. The Chalukyas
✓ C. The Pandyas
✗ D. The Cheras

Question ID : **60092914817**

Q.11 सन् 1922 में भील सेवा मंडल की स्थापना किसने की थी?

Ans
✔ A. अमृतलाल विठ्ठलदास ठक्कर
✘ B. आचार्य प्रफुल्ल चन्द्र राय
✘ C. अच्युत एस. पटवर्धन
✘ D. आचार्य नरेन्द्र देव

Question ID : **60092914818**

Q.12 Which of these dances was brought out from the precincts of the temples to open stages while retaining its essential devotional characteristics by E. Krishnaswamy Iyer and Rukmini Devi Arundale?

Ans
✘ A. Perini Sivatandavam
✘ B. Yakshagana
✘ C. Kuchipudi
✔ D. Bharathanatyam

Question ID : **60092914816**

Q.13 Which of the following is NOT true about Matter and Energy?

Ans
✘ A. Scientists seek to study the flow and interactions of matter and energy, while engineers often seek to minimize inputs and maximize outputs of matter and energy relative to a given system.
✔ B. Energy and matter cannot change forms but can be created or destroyed.
✘ C. Energy and matter are often cycled within a system, and different forms of matter and energy are able to interact.
✘ D. In natural systems, both energy and matter are conserved within a system.

Question ID : **60092914829**

Q.14 What is the name of the World's longest Highway tunnel built by Border Road Organisation that connects Manali to Lahaul-Spiti valley throughout the year?

Ans
✘ A. Gandhi tunnel
✘ B. Rajendra tunnel
✔ C. Atal tunnel
✘ D. Nehru tunnel

Question ID : **60092914819**

Q.15 Which of the following is true about Eukaryotic cell?

Ans
✘ A. Ribosomes - 70 S
✔ B. Nucleus distinct, with well-formed nuclear membrane
✘ C. The chromosome is circular and remains attached to cell membrane at one point
✘ D. Nuclear membrane absent

Question ID : **60092914828**

Q.16 Which gas is created when we combine the solid (baking soda) and the liquid (vinegar)?

Ans
✗ A. Oxygen
✓ B. Carbon Dioxide
✗ C. Nitrogen
✗ D. Hydrogen

Question ID : **60092914827**

Q.17 In which year Sports Authority of India (SAI) was set up?

Ans
✗ A. 1982
✗ B. 1992
✓ C. 1984
✗ D. 1990

Question ID : **60092914825**

Q.18 वी. टी. चौदिया (V.T. Chowdiah), वी शेशन्ना (V. Sheshanna), एम वासुदेव (M. Vasudevacha), दोरेस्वामी अयंगर (Doreswamy Iyengar) और टी के अयंगर (T.K. Iyengar) प्रसिद्ध _____ हैं।

Ans
✗ A. शास्त्रीय गायक
✗ B. शास्त्रीय नर्तक
✓ C. कर्नाटक संगीतज्ञ
✗ D. नाटक कलाकार

Question ID : **60092914815**

Q.19 In 2020, in the United Nations' Human Development Index, India was at rank 131 out of 189 countries. It was dropped by _____ ranks from 2019 to 2020.

Ans
✓ A. 2
✗ B. 4
✗ C. 3
✗ D. 1

Question ID : **60092914822**

Q.20 Which of these is NOT a fundamental duty?

Ans
✗ A. To safeguard public property and to abjure violence
✗ B. to value and preserve the rich heritage of our composite culture
✓ C. who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of three and six years
✗ D. to develop the scientific temper, humanism and the spirit of inquiry and reform

Question ID : **60092914823**

Section : **Arithmetic Ability**

**Q.1** A shopkeeper marked the price 20% more than the cost price. If he allows a discount of 30%, then find his loss percentage.

**Ans**
- ✔ A. 16%
- ✘ B. 18%
- ✘ C. 15%
- ✘ D. 14%

Question ID : **60092914837**

**Q.2** A candidate scores 30% and fails by 50 marks, whereas another candidate who scores 55% marks, get 45 marks more than the minimum required marks to pass the examination. Find the maximum marks for the examination.

**Ans**
- ✘ A. 340
- ✔ B. 380
- ✘ C. 360
- ✘ D. 320

Question ID : **60092914834**

**Q.3** An article is sold at a certain price. By selling it at 2/3 of that price, one losses 20%. Find the gain percentage at the original price.

**Ans**
- ✘ A. 15%
- ✘ B. 10%
- ✘ C. 12%
- ✔ D. 20%

Question ID : **60092914836**

**Q.4** A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $15\sqrt{2}$ cm, then the area of the triangle is:

**Ans**
- ✘ A. $125\sqrt{3}$ cm$^2$
- ✔ B. $100\sqrt{3}$ cm$^2$
- ✘ C. $150\sqrt{3}$ cm$^2$
- ✘ D. $150\sqrt{3}$ cm$^2$

Question ID : **60092914847**

**Q.5** The difference between the compound interest (CI) and simple interest (SI) for 3 years at the rate of 15% is Rs. 567. Find the principal amount.

**Ans**
- ✔ A. Rs. 8000
- ✘ B. Rs. 7000
- ✘ C. Rs. 8500
- ✘ D. Rs. 7500

Question ID : **60092914841**

**Q.6** Refer to the given graph and answer the following question.


| | March | April | May | June | July |
|---|---|---|---|---|---|
| City A | 180 | 156 | 310 | 280 | 305 |
| City B | 220 | 185 | 320 | 240 | 285 |

What is the respective ratio between the total number of tourists in City A in June and July and that in City B in the same months?

**Ans**

✗ A. 115 : 106

✓ B. 117 : 105

✗ C. 120 : 116

✗ D. 118 : 115

Question ID : **60092914846**

**Q.7** A shopkeeper allows a discount of 15% on the marked price of a laptop. By what percentage higher than the cost price should the price be so as to gain 23% on selling it at the SAME discount.

**Ans**

✓ A. $44\frac{12}{17}\%$

✗ B. $43\frac{13}{17}\%$

✗ C. $43\frac{12}{17}\%$

✗ D. $44\frac{13}{17}\%$

Question ID : **60092914838**

**Q.8** Find the compound interest for a sum of Rs. 7750 in 2 years if the rate of interest for the first year is 4% and for the second year is 5% .

**Ans**

✗ A. Rs. 815

✗ B. Rs. 886

✓ C. Rs. 713

✗ D. RS. 796

Question ID : **60092914842**

**Q.9** A number being successively divided by 3, 5 and 7 leaves remainder 2, 1 and 4, respectively. The number is:

**Ans**
- ✔ A. 170
- ✘ B. 165
- ✘ C. 140
- ✘ D. 185

Question ID : **60092914831**

**Q.10** A shopkeeper mixes three varieties of pulses costing Rs. 40, Rs. 30 and Rs. 20 per kg in the ratio of 3 : 4 : 5 in terms of weight and sells the mixture at Rs. 34 per kg. What percentage of profit does the shopkeeper make?

**Ans**
- ✘ A. 25%
- ✔ B. 20%
- ✘ C. 35%
- ✘ D. 32%

Question ID : **60092914835**

**Q.11** One-third of a certain journey was covered at a speed of 30 km/hr, one-fourth at 40 km/hr and the rest at 60 km/hr. Find the approximate average speed for the whole journey.

**Ans**
- ✘ A. 50 km/hr
- ✘ B. 60 km/hr
- ✘ C. 55 km/hr
- ✔ D. 41 km/hr

Question ID : **60092914843**

**Q.12** The average of five consecutive even numbers is 52. The ratio of the second and fourth numbers is:

**Ans**
- ✔ A. 25 : 27
- ✘ B. 12 : 14
- ✘ C. 24 : 29
- ✘ D. 24 : 25

Question ID : **60092914832**

**Q.13** If 64 identical small spheres are made out of a big sphere of diameter 16 cm, what is the surface area of each small sphere?

**Ans**
- ✔ A. $16\pi$
- ✘ B. $12\pi$
- ✘ C. $14\pi$
- ✘ D. $15\pi$

Question ID : **60092914849**

**Q.14** Find the average of 5, 11, 17, … 53, 59.

**Ans**
✗ A. 24
✗ B. 30
✗ C. 28
✓ D. 32

Question ID : **60092914833**

**Q.15** Refer to the given graph and answer the following question.


| | March | April | May | June | July |
|---|---|---|---|---|---|
| City A | 180 | 156 | 310 | 280 | 305 |
| City B | 220 | 185 | 320 | 240 | 285 |

The number of tourists in City A in May were what percentage more than that in City B in April?

**Ans**
✗ A. 86.56%
✗ B. 57.45%
✓ C. 67.56%
✗ D. 76.56%

Question ID : **60092914845**

**Q.16** If the ratio of the diameters of two spheres is 2 : 3, what is the ratio of their volumes?

**Ans**
✗ A. 4 : 9
✓ B. 8 : 27
✗ C. 3 : 2
✗ D. 27 : 8

Question ID : **60092914848**

**Q.17** A sum of money is divided among A, B, C and D in the ratio of 5 : 6 : 9 : 11. If the share of C is Rs. 4725, then what will be the sum of the shares of A and D?

**Ans**
✗ A. Rs. 9300
✗ B. Rs. 6400
✗ C. Rs. 7500
✓ D. Rs. 8400

Question ID : **60092914839**

**Q.18** The sum of three numbers is 332. If the ratio between the 1st and 2nd numbers is 3 : 5 and the ratio between the 2nd and 3rd numbers is 6 : 7, then find the third number.

**Ans**

✗ A. 70

✗ B. 164

✗ C. 125

✓ D. 140

Question ID : **60092914840**

**Q.19** Find the angle between the hour hand and the minute hand of a clock when the time is 04:45.

**Ans**

✗ A. $124\frac{1}{2}^0$

✓ B. $127\frac{1}{2}^0$

✗ C. $125\frac{1}{2}^0$

✗ D. $126\frac{1}{2}^0$

Question ID : **60092914844**

**Q.20** If $\sqrt{5} = 2.24$, then the approximate value of $\frac{11}{\sqrt{5}-2} = ?$

**Ans**

✗ A. 45.52

✗ B. 49.63

✗ C. 43.63

✓ D. 46.64

Question ID : **60092914830**

Section : **General English**

**Q.1** **Select the most appropriate option to fill in the blank.**

**Our professor is a _____ reader.**

**Ans**

✗ A. ravenous

✗ B. uncontrolled

✓ C. voracious

✗ D. covetous

Question ID : **60092914861**

Q.2 Select the option that expresses the given sentence in active voice.

The election was won by my father with a great majority.

Ans
✗ A. My father wins the election with a great majority.
✗ B. My father win the election with a great majority.
✓ C. My father won the election with a great majority.
✗ D. My father is winning the election with a great majority.

Question ID : **60092914850**

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

Docile

Ans
✗ A. Meek
✗ B. Obedient
✗ C. Reserved
✓ D. Assertive

Question ID : **60092914856**

Q.4 Select the option that is the meaning of the underlined proverb.

My grandmother who is ninety, goes for a walk every day. It is <u>better to wear out than rust out</u>.

Ans
✗ A. All old people should walk.
✓ B. It is good to be active rather than idle.
✗ C. It is not good for a ninety-year-old to walk.
✗ D. It is better to be safe than take risks.

Question ID : **60092914860**

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

My friend once complained ____ me _____ his two-year-old son.

Ans
✗ A. for, by
✗ B. with, about
✗ C. to, for
✓ D. to, about

Question ID : **60092914851**

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

**When I married someone from a different caste, I was _____ from our community.**

Ans
✔ A. ostracised
✘ B. moved
✘ C. evacuated
✘ D. banned

Question ID : **60092914862**

Q.7 **Select the most appropriate meaning of the underlined idiom.**

**I wanted to remind my sister to be polite to my mother, but then I decided <u>to let sleeping dogs lie</u>.**

Ans
✘ A. To be mindful of sleeping dogs
✔ B. To ignore something that can cause trouble
✘ C. To be impolite and rude to elders
✘ D. Not to disturb sleeping dogs

Question ID : **60092914858**

Q.8 **Select the most appropriate option to fill in the blanks.**

**I _____ for two hours in the clinic before the doctor _____ me.**

Ans
✘ A. waiting, saw
✘ B. had waited, sees
✘ C. wait, see
✔ D. had been waiting, saw

Question ID : **60092914855**

Q.9 **Select the grammatically correct sentence from the given options.**

Ans
✘ A. The court the tribunal to reassess the ordered situation.
✘ B. All pensioners a life certificate have to provide every year.
✘ C. Please do not make this public, it is between you and only me.
✔ D. Having listed all the advantages of the product, I shall now move on to list some of the disadvantages.

Question ID : **60092914864**

Q.10 Select the option that expresses the given sentence in direct speech.

The boy asked the old man if he needed any help.

Ans
✔ A. The boy said to the old man, "Do you need any help?"
✘ B. The boy said to the old man, "Did you need any help?"
✘ C. The boy said to the old man, "Does he need any help?"
✘ D. The boy said to the old man, "Did I need any help?"

Question ID : **60092914852**

Q.11 Select the option that expresses the given sentence in reported speech.

I said to my friend, "Why are you limping, have you hurt yourself?"

Ans
✔ A. I asked my friend why he was limping, and enquired if he had hurt himself.
✘ B. I asked my friend why he is limping, and enquired if he had hurt himself.
✘ C. I asked my friend why he was limping, and enquired if I had hurt himself.
✘ D. I asked my friend why he limped, and enquired if he had hurt himself.

Question ID : **60092914853**

Q.12 Select the most appropriate meaning of the underlined proverb.

Don't worry about that man. Barking dogs seldom bite.

Ans
✘ A. People who pick up a fight easily
✘ B. People who shout loudly
✔ C. People who always threaten do not usually harm
✘ D. People who harm by threatening

Question ID : **60092914859**

Q.13 Select the grammatically correct and meaningful sentence.

Ans
✘ A. The state government for law and order is responsible in the state.
✘ B. Paras is mindful always of his language in the presence of elders.
✘ C. Usha on her laptop since morning has been working.
✔ D. The unprecedented rains have caused havoc in many cities.

Question ID : **60092914863**

Q.14 Select the most appropriate option to fill in the blank.

I _____ for the entrance exam next month.

Ans
✗ A. am appear
✓ B. will be appearing
✗ C. appeared
✗ D. will be appear

Question ID : **60092914854**

Q.15 Select the most appropriate ANTONYM of the given word.

Anarchy

Ans
✓ A. Peace
✗ B. Chaos
✗ C. Turmoil
✗ D. Lawlessness

Question ID : **60092914857**

**Comprehension:**

Read the given passage and answer the questions that follow.

It was just another day in 2004. While creating patterns on a manuscript, veteran lettering artist Maria Thomas experienced feelings of complete relaxation, focus, well-being, timelessness and liberation. Rick Roberts, her husband, a seeker of the true meaning of life, was by her side then. He immediately identified the meditating mind. Later, when they discussed it, they felt inspired to look deeper. Together, they came up with a disciplined technique of doodling that can help anyone attain a meditative state of 'creative mindfulness'. They refined the technique further and called it 'Zentangle'.

They have patented the technique, and today, they teach it to thousands of students across the globe, offering successful ones the title of Certified Zentangle Teachers (CZT).
"Zentangle is nothing new to us," says Nidhi Aggarwal, who learned it from one of the few CZTs in India. "Indians have been doing rangolis for ages, and the repetitive patterns and designs may well form the background of Zentangle." The technique behind Zentangle makes this kind of pattern-making more formal, more systematic, and with a spiritual tone to it. The philosophy is simple: drawing repetitive patterns on a small piece of paper keeps you focused on the drawing itself and distracted from problems. In the process, it relaxes and rejuvenates your mind. The outcome is a calm mind, as well as a unique piece of art that fills you with a feeling of success and worthiness.
Psychologically, tangling helps in busting stress, managing anger, creating a stronger mind that helps to own up to mistakes. It enforces mindfulness through 'creative aimlessness'. It may be new, but as Psychology Today says, "The basic principles are as old as the history of art".
While Zentangling, you don't plan out the drawing beforehand; rather, you let your mind take over and allow lines and shapes to emerge unintentionally.
The best part is that there are no mistakes or wrong strokes. You don't use erasers. Each stroke or line is an opportunity to build upon. It represents life — each decision, each task is mindfully conducted, and there are no mistakes. Whatever emerges from it gives you new opportunities to build on.
There is no rule about how to start drawing a zentangle. You can start from anywhere and end anywhere. It's intuitive, and once you begin, you'll feel the calm descending.

**SubQuestion No : 16**

**Q.16 The passage is mainly about:**

**Ans**

✗ A. the need for people to zentangle

✗ B. the rules and methods of zentangling

✗ C. the popularity of zentangles

✓ D. zentangling as a meditative form of art

Question ID : **60092914870**

**Comprehension:**

Read the given passage and answer the questions that follow.

It was just another day in 2004. While creating patterns on a manuscript, veteran lettering artist Maria Thomas experienced feelings of complete relaxation, focus, well-being, timelessness and liberation. Rick Roberts, her husband, a seeker of the true meaning of life, was by her side then. He immediately identified the meditating mind. Later, when they discussed it, they felt inspired to look deeper. Together, they came up with a disciplined technique of doodling that can help anyone attain a meditative state of 'creative mindfulness'. They refined the technique further and called it 'Zentangle'.

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**SubQuestion No : 17**

**Q.17 Why are erasers not used while making zentangles?**

**Ans**

✗ A. It is believed that it is wrong to erase.

✗ B. One is supposed to make perfect designs.

✓ C. It is believed that there are no mistakes made.

✗ D. Using an eraser would deface the pattern.

Question ID : **60092914869**

**Comprehension:**

Read the given passage and answer the questions that follow.

It was just another day in 2004. While creating patterns on a manuscript, veteran lettering artist Maria Thomas experienced feelings of complete relaxation, focus, well-being, timelessness and liberation. Rick Roberts, her husband, a seeker of the true meaning of life, was by her side then. He immediately identified the meditating mind. Later, when they discussed it, they felt inspired to look deeper. Together, they came up with a disciplined technique of doodling that can help anyone attain a meditative state of 'creative mindfulness'. They refined the technique further and called it 'Zentangle'.

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**SubQuestion No : 18**

**Q.18 Why is the art of zentangles not new to us in India?**

**Ans**

✗ A. Indians are born artists.

✓ B. We have always been making repetitive patterns in the form of rangolis.

✗ C. Meditation originated in India.

✗ D. It was always an art form in India.

Question ID : **60092914867**

**Comprehension:**

Read the given passage and answer the questions that follow.

It was just another day in 2004. While creating patterns on a manuscript, veteran lettering artist Maria Thomas experienced feelings of complete relaxation, focus, well-being, timelessness and liberation. Rick Roberts, her husband, a seeker of the true meaning of life, was by her side then. He immediately identified the meditating mind. Later, when they discussed it, they felt inspired to look deeper. Together, they came up with a disciplined technique of doodling that can help anyone attain a meditative state of 'creative mindfulness'. They refined the technique further and called it 'Zentangle'.

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**SubQuestion No : 19**

**Q.19 Which of the following statements is true?**

**Ans**

✔ A. Maria and Rick accidentally discovered the art of zentangles.

✘ B. Maria and Rick do not teach the art of zentangles.

✘ C. Maria and Rick purposely invented the zentangles

✘ D. Maria and Rick were taught the art of zentangles.

Question ID : **60092914866**

**Comprehension:**

Read the given passage and answer the questions that follow.

It was just another day in 2004. While creating patterns on a manuscript, veteran lettering artist Maria Thomas experienced feelings of complete relaxation, focus, well-being, timelessness and liberation. Rick Roberts, her husband, a seeker of the true meaning of life, was by her side then. He immediately identified the meditating mind. Later, when they discussed it, they felt inspired to look deeper. Together, they came up with a disciplined technique of doodling that can help anyone attain a meditative state of 'creative mindfulness'. They refined the technique further and called it 'Zentangle'.

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**SubQuestion No : 20**

**Q.20 How is Zentangle art different from all other forms of art?**

**Ans**

✗ A. It is very simple and easy.

✗ B. It is an inborn talent.

✗ C. There are no courses for this art.

✓ D. The artist does not have a plan in mind.

Question ID : **60092914868**

Section : **General Hindi**

**Q.1 दिए गए वाक्यों में से अपूर्ण भूत काल का उदाहरण है-**

**Ans**

✗ A. सीता किताब पढ़ सकती है।

✗ B. सीता किताब पढ़ रही है।

✗ C. सीता किताब पढ़ रही होगी।

✓ D. सीता किताब पढ़ रही थी।

Question ID : **60092914884**

Q.2 संज्ञाओं के साथ आने वाली विभक्तियाँ होती है-

Ans
✗ A. विशेष
✗ B. संश्लिष्ट
✓ C. विश्लिष्ट
✗ D. संक्षिप्त

Question ID : **60092914871**

Q.3 निर्दय' का सन्धि विच्छेद होगा-

Ans
✓ A. निः + दय
✗ B. नि + दय
✗ C. निर + दय
✗ D. निः + र्दय

Question ID : **60092914873**

Q.4 निम्न में से 'वदान्यता' का पर्याय है-

Ans
✓ A. उदारता
✗ B. उदासीनता
✗ C. उद्धार
✗ D. निमित्त

Question ID : **60092914880**

Q.5 "नित्य ही नहाता है चंद्रमा क्षीर सागर में,
सुंदरि! मानो तुम्हारे मुख की समता के लिए।"

उपरोक्त पंक्तियों में अलंकार है-

Ans
✗ A. निदर्शना
✗ B. वस्तुत्प्रेक्षा
✗ C. हेतुत्प्रेक्षा
✓ D. फलोत्प्रेक्षा

Question ID : **60092914877**

Q.6 अटकलें भिड़ाना' का अर्थ होगा-

Ans
✓ A. उपाय सोचना
✗ B. पहेलियाँ बूझना
✗ C. लड़ाई करवाना
✗ D. कल्पना करना

Question ID : **60092914881**

Q.7 निम्न में से आसन्न भूत काल का उदाहरण वाक्य है-

Ans
✗ A. सीता ने आज मंदिर में पूजाकी थी।
✗ B. सीता आज मंदिर में पूजा करेगी।
✗ C. सीता आज मंदिर में पूजा कर रही होगी।
✓ D. सीता ने आज मंदिर में पूजा की है।

Question ID : **60092914885**

Q.8 कहे खेत की सुने खलिहान की' लोकोक्ति का अर्थ होगा-

Ans
✗ A. बात का गलत अर्थ निकालना
✓ B. कुछ का कुछ सुनना
✗ C. कुछ सुनने को तैयार न होना
✗ D. द्विअर्थी बात करना

Question ID : **60092914882**

Q.9 'लोगों ने शोर मचाकर चोर को भगा दिया।' वाक्य में कौन सा कारक है?

Ans
✗ A. अपादानकारक
✓ B. कर्मकारक
✗ C. करणकारक
✗ D. कर्त्ताकारक

Question ID : **60092914872**

Q.10 निम्न में से 'नलिन' का पर्याय है-

Ans
✗ A. गुलाब
✗ B. अंबा
✓ C. पद्म
✗ D. कौमुदी

Question ID : **60092914878**

Q.11 चक्रपाणि' में समास है-

Ans
✓ A. संबंध बहुव्रीहि
✗ B. अधिकरण बहुव्रीहि
✗ C. कर्ता बहुव्रीहि
✗ D. अपादान बहुव्रीहि

Question ID : **60092914875**

Q.12 "मैं जो नया ग्रंथ विलोकता हूँ,
मात मुझे सो नव मित्र-सा है।
देखूँ उसे मैं नित बार-बार,
मानो मिला मित्र मुझे पुराना।"

पंक्तियों में अलंकार है-

Ans
✗ A. उपमा
✗ B. दृष्टांत
✗ C. रूपक
✓ D. उत्प्रेक्षा

Question ID : **60092914876**

Q.13 बादल हैं लगता है, वर्षा होगी।' वाक्य उदाहरण है-

Ans
✗ A. हेतुहेतुमद् वर्तमान
✗ B. सामान्यभविष्य
✓ C. हेतुहेतुमद्भविष्य
✗ D. संभाव्य भविष्य

Question ID : **60092914883**

Q.14 हवनकुंड' में समास है-

Ans
✗ A. करणतत्पुरुष
✗ B. अपादान तत्पुरुष
✗ C. कर्म तत्पुरुष
✓ D. सम्प्रदान तत्पुरुष

Question ID : **60092914874**

Q.15 निम्न में से 'कुबेर' का पर्यायवाची नहीं है-

Ans
✗ A. धनेश
✗ B. किन्नरेश
✗ C. यक्षराज
✓ D. मन्मथ

Question ID : **60092914879**

**Comprehension:**

एक उपन्यासकार के रूप में रांगेय राघव का आगमन 'घरौंदे' (1946) के साथ हुआ। यह कालेज के कैम्पस-जीवन पर केंद्रित उपन्यास था। कुल मिलाकर रांगेय राघव ने अड़तीस उपन्यास लिखे। जिनमें 'विषादमठ' (1946), 'हुज़ूर' (1951), 'राई और पर्वत' (1958), नटों और लौह पीटों के कबीलाई समाज पर आधारित'कब तक पुकारु. (1957), मोहन जोदड़ो को पृष्ठभूमि बनाकर लिखा गया 'मुर्दों का टीला'( 1948), 'चीवर'(1951), 'पथ का पाप' (1959), 'राह न रुकी' (1958), 'आखिरी आवाज़'(1962), 'छोटी सी बात'(1959)आदि उनके महत्त्वपूर्ण उपन्यास है। रांगेय राघव की सर्जन-क्षमता का सर्वश्रेष्ठ रूप उनके ऐतिहासिक-सांस्कृतिक उपन्यासों में मिलता है। इसका सबसे महत्त्वपूर्ण कारण एक ओर यदि उनकी असाधारण सर्जनात्मक कल्पना है, जिसके द्वारा वे अतीत को पुनर्निर्मित करते हैं, वहीं उनकी सरल और प्रवाहपूर्ण भाषा भी है जो नाटकीय भंगिमा के बावजूद पठनीयता के गुणों से भरपूर है। अपनी प्रगतिवादी मान्यताओं और जीवन-दर्शन को वे संस्कृति और इतिहास की विशाल पृष्ठभूमि पर परीक्षित और मूल्यांकित करते चलते हैं। प्राचीन भारतीय संत-परम्परा के मानवतावादी स्वरूप ने उन्हें गहराई से प्रभावित किया था। भारतीय इतिहास के बहुत बड़े अंश को उन्होंने अपनी गाथाओं और उपन्यासों के माध्यम से प्रस्तुत किया है। किंतु वे न तो कन्हैया लाल मुंशी की तरह अतीत से सम्मोहित हैं और न ही अनेक आधुनिक लेखकों की तरह अपने वर्तमान को इतिहास पर फूहड़ और क्रूड ढंग से आरोपित करते हैं।

**SubQuestion No : 16**

**Q.16 रांगेय राघव के उपन्यासों का प्रकाशन वर्ष की दृष्टि से बढ़ते हुए क्रम में सही विकल्प है--**

**Ans**

✗ A. विषादमठ, ,कब तक पुकारुँ, पथ का पाप, चीवर

✗ B. चीवर,कब तक पुकारुँ, पथ का पाप, विषाद मठ

✓ C. विषादमठ, चीवर, कब तक पुकारुँ, पथ का पाप

✗ D. पथ का पाप, विषादमठ, चीवर,कब तक पुकारुँ

Question ID : **60092914890**

**Comprehension:**

एक उपन्यासकार के रूप में रांगेय राघव का आगमन 'घरौंदे' (1946) के साथ हुआ। यह कालेज के कैम्पस-जीवन पर केंद्रित उपन्यास था। कुल मिलाकर रांगेय राघव ने अड़तीस उपन्यास लिखे। जिनमें 'विषादमठ' (1946), 'हुज़ूर' (1951), 'राई और पर्वत' (1958), नटों और लौह पीटों के कबीलाई समाज पर आधारित'कब तक पुकारु. (1957), मोहन जोदड़ो को पृष्ठभूमि बनाकर लिखा गया 'मुर्दों का टीला'( 1948), 'चीवर'(1951), 'पथ का पाप' (1959), 'राह न रुकी' (1958), 'आखिरी आवाज़'(1962), 'छोटी सी बात'(1959)आदि उनके महत्त्वपूर्ण उपन्यास है। रांगेय राघव की सर्जन-क्षमता का सर्वश्रेष्ठ रूप उनके ऐतिहासिक-सांस्कृतिक उपन्यासों में मिलता है। इसका सबसे महत्त्वपूर्ण कारण एक ओर यदि उनकी असाधारण सर्जनात्मक कल्पना है, जिसके द्वारा वे अतीत को पुनर्निर्मित करते हैं, वहीं उनकी सरल और प्रवाहपूर्ण भाषा भी है जो नाटकीय भंगिमा के बावजूद पठनीयता के गुणों से भरपूर है। अपनी प्रगतिवादी मान्यताओं और जीवन-दर्शन को वे संस्कृति और इतिहास की विशाल पृष्ठभूमि पर परीक्षित और मूल्यांकित करते चलते हैं। प्राचीन भारतीय संत-परम्परा के मानवतावादी स्वरूप ने उन्हें गहराई से प्रभावित किया था। भारतीय इतिहास के बहुत बड़े अंश को उन्होंने अपनी गाथाओं और उपन्यासों के माध्यम से प्रस्तुत किया है। किंतु वे न तो कन्हैया लाल मुंशी की तरह अतीत से सम्मोहित हैं और न ही अनेक आधुनिक लेखकों की तरह अपने वर्तमान को इतिहास पर फूहड़ और क्रूड ढंग से आरोपित करते हैं।

**SubQuestion No : 17**

**Q.17 रांगेय राघव के विषय में असत्य है-**

**Ans**

✗ A. भारतीय इतिहास की अनेक गाथाओं को उन्होंने अपने उपन्यासों का विषय बनाया।

✓ B. वह प्राचीन भारतीय सूफी-परम्परा के मानवतावादी स्वरूप से प्रभावित थे।

✗ C. अपनी असाधारण सर्जनात्मक कल्पना के द्वारा वह अतीत को पुनर्निर्मित करते हैं।

✗ D. वह प्रगतिवादी मान्यताओं और जीवन दर्शन के पोषक है।

Question ID : **60092914891**

**Comprehension:**

एक उपन्यासकार के रूप में रांगेय राघव का आगमन 'घरौंदे' (1946) के साथ हुआ। यह कालेज के कैम्पस-जीवन पर केंद्रित उपन्यास था। कुल मिलाकर रांगेय राघव ने अड़तीस उपन्यास लिखे। जिनमें 'विषादमठ' (1946), 'हुज़ूर' (1951), 'राई और पर्वत' (1958), नटों और लौह पीटों के कबीलाई समाज पर आधारित'कब तक पुकारु. (1957), मोहन जोदड़ो को पृष्ठभूमि बनाकर लिखा गया 'मुर्दों का टीला'( 1948), 'चीवर'(1951), 'पथ का पाप' (1959), 'राह न रुकी' (1958), 'आखिरी आवाज़'(1962), 'छोटी सी बात'(1959)आदि उनके महत्त्वपूर्ण उपन्यास है। रांगेय राघव की सर्जन-क्षमता का सर्वश्रेष्ठ रूप उनके ऐतिहासिक-सांस्कृतिक उपन्यासों में मिलता है। इसका सबसे महत्त्वपूर्ण कारण एक ओर यदि उनकी असाधारण सर्जनात्मक कल्पना है, जिसके द्वारा वे अतीत को पुनर्निर्मित करते हैं, वहीं उनकी सरल और प्रवाहपूर्ण भाषा भी है जो नाटकीय भंगिमा के बावजूद पठनीयता के गुणों से भरपूर है। अपनी प्रगतिवादी मान्यताओं और जीवन-दर्शन को वे संस्कृति और इतिहास की विशाल पृष्ठभूमि पर परीक्षित और मूल्यांकित करते चलते हैं। प्राचीन भारतीय संत-परम्परा के मानवतावादी स्वरूप ने उन्हें गहराई से प्रभावित किया था। भारतीय इतिहास के बहुत बड़े अंश को उन्होंने अपनी गाथाओं और उपन्यासों के माध्यम से प्रस्तुत किया है। किंतु वे न तो कन्हैया लाल मुंशी की तरह अतीत से सम्मोहित हैं और न ही अनेक आधुनिक लेखकों की तरह अपने वर्तमान को इतिहास पर फूहड़ और क्रूड ढंग से आरोपित करते हैं।

**SubQuestion No : 18**

**Q.18 परीक्षित का अर्थ है--**

**Ans**

✔ A. जिसकी परीक्षा ली गई हो

✘ B. रक्षा करने वाला

✘ C. जिसकी रक्षा की गई हो

✘ D. परियों का रक्षक

Question ID : **60092914888**

**Comprehension:**

एक उपन्यासकार के रूप में रांगेय राघव का आगमन 'घरौंदे' (1946) के साथ हुआ। यह कालेज के कैम्पस-जीवन पर केंद्रित उपन्यास था। कुल मिलाकर रांगेय राघव ने अड़तीस उपन्यास लिखे। जिनमें 'विषादमठ' (1946), 'हुज़ूर' (1951), 'राई और पर्वत' (1958), नटों और लौह पीटों के कबीलाई समाज पर आधारित'कब तक पुकारु. (1957), मोहन जोदड़ो को पृष्ठभूमि बनाकर लिखा गया 'मुर्दों का टीला'( 1948), 'चीवर'(1951), 'पथ का पाप' (1959), 'राह न रुकी' (1958), 'आखिरी आवाज़'(1962), 'छोटी सी बात'(1959)आदि उनके महत्त्वपूर्ण उपन्यास है। रांगेय राघव की सर्जन-क्षमता का सर्वश्रेष्ठ रूप उनके ऐतिहासिक-सांस्कृतिक उपन्यासों में मिलता है। इसका सबसे महत्त्वपूर्ण कारण एक ओर यदि उनकी असाधारण सर्जनात्मक कल्पना है, जिसके द्वारा वे अतीत को पुनर्निर्मित करते हैं, वहीं उनकी सरल और प्रवाहपूर्ण भाषा भी है जो नाटकीय भंगिमा के बावजूद पठनीयता के गुणों से भरपूर है। अपनी प्रगतिवादी मान्यताओं और जीवन-दर्शन को वे संस्कृति और इतिहास की विशाल पृष्ठभूमि पर परीक्षित और मूल्यांकित करते चलते हैं। प्राचीन भारतीय संत-परम्परा के मानवतावादी स्वरूप ने उन्हें गहराई से प्रभावित किया था। भारतीय इतिहास के बहुत बड़े अंश को उन्होंने अपनी गाथाओं और उपन्यासों के माध्यम से प्रस्तुत किया है। किंतु वे न तो कन्हैया लाल मुंशी की तरह अतीत से सम्मोहित हैं और न ही अनेक आधुनिक लेखकों की तरह अपने वर्तमान को इतिहास पर फूहड़ और क्रूड ढंग से आरोपित करते हैं।

**SubQuestion No : 19**

**Q.19 रांगेय राघव की सर्जन क्षमता का सर्वश्रेष्ठ रूप मिलता है--**

**Ans**

✘ A. राजनीतिक उपन्यासोंमें

✘ B. सामाजिक उपन्यासोंमें

✘ C. व्यंग्यात्मक उपन्यासोंमें

✔ D. ऐतिहासिक उपन्यासों में

Question ID : **60092914889**

**Comprehension:**

एक उपन्यासकार के रूप में रांगेय राघव का आगमन 'घरौंदे' (1946) के साथ हुआ। यह कालेज के कैम्पस-जीवन पर केंद्रित उपन्यास था। कुल मिलाकर रांगेय राघव ने अड़तीस उपन्यास लिखे। जिनमें 'विषादमठ' (1946), 'हुज़ूर' (1951), 'राई और पर्वत' (1958), नटों और लौह पीटों के कबीलाई समाज पर आधारित'कब तक पुकारु. (1957), मोहन जोदड़ो को पृष्ठभूमि बनाकर लिखा गया 'मुर्दों का टीला'( 1948), 'चीवर'(1951), 'पथ का पाप' (1959), 'राह न रुकी' (1958), 'आखिरी आवाज़'(1962), 'छोटी सी बात'(1959)आदि उनके महत्त्वपूर्ण उपन्यास है। रांगेय राघव की सर्जन-क्षमता का सर्वश्रेष्ठ रूप उनके ऐतिहासिक-सांस्कृतिक उपन्यासों में मिलता है। इसका सबसे महत्त्वपूर्ण कारण एक ओर यदि उनकी असाधारण सर्जनात्मक कल्पना है, जिसके द्वारा वे अतीत को पुनर्निर्मित करते हैं, वहीं उनकी सरल और प्रवाहपूर्ण भाषा भी है जो नाटकीय भंगिमा के बावजूद पठनीयता के गुणों से भरपूर है। अपनी प्रगतिवादी मान्यताओं और जीवन-दर्शन को वे संस्कृति और इतिहास की विशाल पृष्ठभूमि पर परीक्षित और मूल्यांकित करते चलते हैं। प्राचीन भारतीय संत-परम्परा के मानवतावादी स्वरूप ने उन्हें गहराई से प्रभावित किया था। भारतीय इतिहास के बहुत बड़े अंश को उन्होंने अपनी गाथाओं और उपन्यासों के माध्यम से प्रस्तुत किया है। किंतु वे न तो कन्हैया लाल मुंशी की तरह अतीत से सम्मोहित हैं और न ही अनेक आधुनिक लेखकों की तरह अपने वर्तमान को इतिहास पर फूहड़ और क्रूड ढंग से आरोपित करते हैं।

**SubQuestion No : 20**

**Q.20 कैम्पस जीवन पर आधारित रांगेय राघव का उपन्यास है-**

**Ans**

✗ A. राह न रुकी

✓ B. घरौंदे

✗ C. छोटी सी बात

✗ D. आखिरी आवाज़

Question ID : **60092914887**

Section : **Discipline1**

**Q.1** Find the value of the following.

$$\int \frac{1}{\sqrt{x^2+a^2}}\,dx$$

**Ans**

✗ A. $(\text{Sin}^{-1}\, x/a) + C$

✓ B. $\text{Log}\,[x + (x^2 + a^2)^{1/2}] + C$

✗ C. $1/\,(2a\,[\{\text{Log}\,(x-a)\} + \{\text{Log}\,(x+a)\}] + C)$

✗ D. $1/\,(2a\,[\{\text{Log}\,(x+a)\} - \{\text{Log}\,(x-a)\}] + C)$

Question ID : **60092914896**

**Q.2** Find the coefficient of $x^3y^6$ in the expansion $(x+2y)^9$.

**Ans**

✗ A. 288

✗ B. 576

✓ C. 672

✗ D. 1008

Question ID : **60092914897**

**Q.3** Activation energy for acid hydrolysis of sucrose is 6.22 kJ/mol. What will be the activation energy when hydrolysed by the enzyme, sucrase?

**Ans**
- ✗ A. Double of 6.22 kJ/mol
- ✗ B. 6.22 kJ/mol
- ✓ C. Less than 6.22 kJ/mol
- ✗ D. Slightly more than 6.22 kJ/mol

Question ID : **60092914902**

**Q.4** Which of the following carbohydrates are stored in the animal body in the liver, muscles and brain?

**Ans**
- ✗ A. Cellulose
- ✗ B. Amylose
- ✓ C. Glycogen
- ✗ D. Amylopectin

Question ID : **60092914901**

**Q.5** Which of the following is NOT true for potential difference?

**Ans**
- ✗ A. It exists between any two points in a circuit.
- ✓ B. It is measured in open circuit
- ✗ C. It is less than the EMF in the same circuit.
- ✗ D. It is the effect of current flow

Question ID : **60092914903**

**Q.6** Find the value of $d/dx\ (-Cot^{-1}\ x)$.

**Ans**
- ✗ A. $1/(1-x^2)^{1/2}$
- ✗ B. $1/(1+x^2)^{1/2}$
- ✓ C. $1/(1+x^2)$
- ✗ D. $1/(1-x^2)$

Question ID : **60092914895**

**Q.7** What is the relation between the focal length (f) and the radius of curvature (R) for a convex spherical mirror?

**Ans**
- ✗ A. $R = f/2$
- ✗ B. $(1/R) - (1/f) = 1$
- ✗ C. $(1/R) + (1/f) = 1$
- ✓ D. $f = R/2$

Question ID : **60092914898**

**Q.8** Which of the following substances has the highest refractive index as the medium?

**Ans**
- ✗ A. Water
- ✗ B. Dense flint glass
- ✗ C. Crown glass
- ✓ D. Diamond

Question ID : **60092914899**

**Q.9** A 6-pole wave connected armature has 300 conductors and runs at 1000 rpm. The EMF generated is 600 volts. Find the useful flux per pole.

**Ans**
- ✓ A. 0.04 Wb
- ✗ B. 0.06 Wb
- ✗ C. 0.0265 Wb
- ✗ D. 0.013 Wb

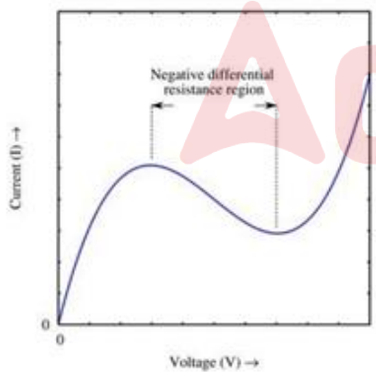
Question ID : **60092914910**

**Q.10** What is the total number of orbitals associated with the principal quantum number n = 3?

**Ans**
- ✓ A. 9
- ✗ B. 3
- ✗ C. 27
- ✗ D. 18

Question ID : **60092914892**

**Q.11**




Which of the following diodes has the above V-I characteristics?

**Ans**
- ✗ A. Schottky diode
- ✓ B. Tunnel diode
- ✗ C. Varactor diode
- ✗ D. Zener diode

Question ID : **60092914908**

**Q.12** What is the equation for a sinusoidal current of 25 Hz frequency having RMS value of 40 ampere?

**Ans**

✗ A. 62.89 Sin 157t

✗ B. 56.57 Sin 314t

✗ C. 62.89 Sin 314t

✓ D. 56.57 Sin 157t

Question ID : **60092914904**

**Q.13** Light from a point source in air falls on a spherical glass surface (n = 1.5 and radius of curvature = 20 cm). The distance of the light source from the glass surface is 100 cm. At what position will the image be formed?

**Ans**

✗ A.
At a distance of 100 cm from the glass surface, opposite to the direction of incident light.

✓ B.
At a distance of 100 cm from the glass surface, in the direction of incident light.

✗ C.
At a distance of 200 cm from the glass surface, in the direction of incident light.

✗ D.
At a distance of 200 cm from the glass surface, opposite to the direction of incident light.

Question ID : **60092914900**

**Q.14** Calculate the energy of radiation of one mole of photons, whose frequency is $5 \times 10^{14}$ Hz.

**Ans**

✗ A. 19.951 kJ/mole

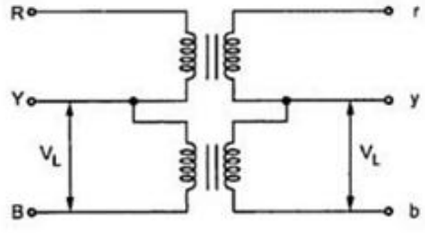
✗ B. $33.13 \times 10^{-19}$ J/mol

✗ C. $3.313 \times 10^{-19}$ J/mol

✓ D. 199.51 kJ/mole

Question ID : **60092914894**

**Q.15** Identify the connection type in the given transformer.




**Ans**

✗ A. STAR-STAR connection

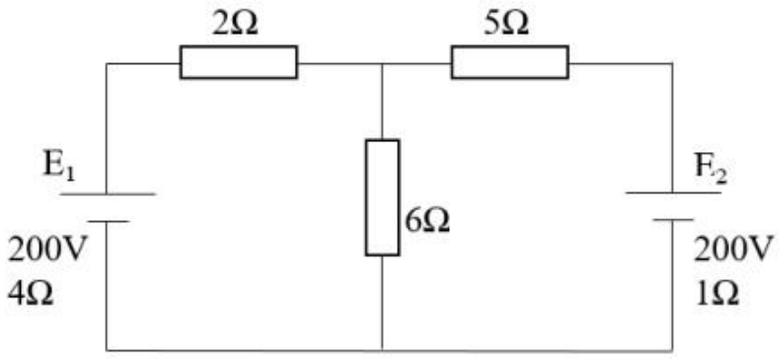
✗ B. Delta-STAR Connection

✗ C. Scot-Connection or T-T connection

✓ D. Open delta or V-V connection

Question ID : **60092914911**

Q.16




Find the current flowing in the 6 Ω resistor.

Ans

✗ A. 33.33 amps

✗ B. −11.11 amps

✗ C. 11.11 amps

✓ D. 22.22 amps

Question ID : **60092914907**

Q.17 The number of electrons, protons and neutrons in a species are equal to 18, 16 and 16, respectively. Assign the proper symbol to the species.

Ans

✗ A. $^{32}_{18}S^{16}$

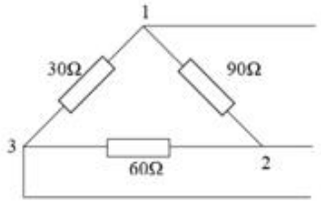
✓ B. $^{32}_{16}S^{2}$

✗ C. $^{32}_{16}S^{18}$

✗ D. $^{18}_{16}S^{32}$

Question ID : **60092914893**

Q.18 Find the STAR resistance for the given Delta.




Ans

✓ A. R1 = 15 Ω, R2 = 30 Ω, R3 = 10 Ω

✗ B. R1 = 10 Ω, R2 = 15 Ω, R3 = 30 Ω

✗ C. R1 = 30 Ω, R2 = 20 Ω, R3 = 15 Ω

✗ D. R1 = 20 Ω, R2 = 10 Ω, R3 = 20 Ω

Question ID : **60092914906**

Q.19 Which of the following statements is true for a MOSFET?

Ans
✗ A. MOSFETs are difficult to fabricate.

✗ B. Drain resistance of a MOSFET is much higher than that of a JFET.

✓ C. Depletion type MOSFETS may be operated in both depletion and enhancement mode.

✗ D. Input resistance is very low.

Question ID : **60092914909**

Q.20 A 40 kVA single phase transformer has 400 turns on the primary and 100 turns on the secondary. The primary is connected to 2000 V, 50 Hz frequency supply. Determine the maximum flux.

Ans
✓ A. 0.0225 Wb

✗ B. 0.1 Wb

✗ C. 0.0025 Wb

✗ D. 0.01 Wb

Question ID : **60092914905**

Section : **Discipline2**

Q.1 Find the channel capacity (C) according to Gaussian noise interference for an additive white (spectrally flat) with an ideal bandlimited channel of bandwidth W, where P is the average transmitted power and $N_0$ is the power-spectral density of the additive noise.

Ans
✗ A. $C = W \log_e(1 + P/ W * N_0)$ bits/s

✓ B. $C = W \log_2(1 + P/ W * N_0)$ bits/s

✗ C. $C = W \log_e (1 + W * N_0/P)$ bits/s

✗ D. $C = W \log_2(1 + W * N_0/P)$ bits/s

Question ID : **60092914916**

Q.2 Which of the following is true for an open loop control system when compared to a closed loop control system?

Ans
✗ A. Intelligent control system

✗ B. Large band width

✗ C. Prone to instability

✓ D. Very sensitivity in nature

Question ID : **60092914918**

**Q.3** A Schottky TTL logic family has the following input and output current specifications:

1. The maximum output HIGH-state current = 1 mA.
2. The maximum output LOW-state current = 20 mA.
3. The maximum input HIGH-state current = 50 μA.
4. The maximum input LOW-state current = 2 mA.

The output of an inverter belonging to this family feeds the clock inputs of various flip-flops belonging to the same family. How many flip-flops can be driven by the output of this inverter providing the clock signal?

**Ans**
- ✗ A. 5
- ✗ B. 15
- ✓ C. 10
- ✗ D. 20

Question ID : **60092914914**

**Q.4** Which of the following laws/theorems expresses the given equality?

$$(A+B)=(\overline{\overline{A}}+\overline{\overline{B}})$$

**Ans**
- ✗ A. De Morgan's theorem
- ✓ B. Involution law
- ✗ C. Transposition theorem
- ✗ D. Idempotent law

Question ID : **60092914913**

**Q.5** Which of the following is NOT a data transfer instruction in 8085 microprocessors?

**Ans**
- ✓ A. ANA R/M
- ✗ B. LDA address
- ✗ C. STA address
- ✗ D. MOV destination, source

Question ID : **60092914921**

**Q.6** Which of the following is NOT a method used to reduce the starting current of induction motors?

**Ans**
- ✓ A. Silicon controlled rectifier starter
- ✗ B. DOL (Direct Online) starter
- ✗ C. Auto transformer starter
- ✗ D. Star-delta starter

Question ID : **60092914925**

**Q.7** How many thyristors are used in the circuit of a single-phase dual converter?

**Ans**
- ✗ A. 1
- ✓ B. 8
- ✗ C. 2
- ✗ D. 4

Question ID : **60092914931**

**Q.8** Which of the following is NOT the effect of PF improvement by capacitor addition?

**Ans**
- ✗ A. $I^2R$ power losses are reduced in the system because of reduction in current
- ✗ B. Reactive component of the network is reduced
- ✓ C. Voltage level at the load end is decreased
- ✗ D. KVA loading on the source generators reduces

Question ID : **60092914930**

**Q.9** An ultra-large-scale integration (ULSI) chip contains circuitry equivalent in complexity to more than ____ gates.

**Ans**
- ✗ A. 1000000
- ✓ B. 100000
- ✗ C. 10000
- ✗ D. 1000

Question ID : **60092914920**

**Q.10** Find the equation for armature current (Ia) of starter DC motor, where V is the supply voltage, Eb is the back EMF and Ra is the armature resistance.

**Ans**
- ✗ A. (Eb − V)/Ra
- ✗ B. (V + Eb)/Ra
- ✗ C. V/ Ra
- ✓ D. (V − Eb)/Ra

Question ID : **60092914923**

**Q.11** Which of the following gates are known as universal gates?

**Ans**
- ✓ A. NOR and NAND Gates
- ✗ B. OR and NOR Gates
- ✗ C. OR, AND and NOT gates
- ✗ D. AND and NAND Gates

Question ID : **60092914912**

**Q.12** Which of the following instructions in 8085 microprocessors Logically OR the contents of the register/memory with the contents of the accumulator?

**Ans**

✔ A. ORA R/M

✘ B. ORI eight-bit

✘ C. ANI eight-bit

✘ D. XRA R/M

Question ID : **60092914922**

**Q.13** A lux meter is used to measure the illumination levels. What is the main constituent of this instrument?

**Ans**

✘ A. Photo transistor

✘ B. Electron beam welded resistor

✔ C. Photo diode

✘ D. Photo resistor

Question ID : **60092914927**

**Q.14** Find the Laplace transform of exponentially decaying sine wave ($e^{-\alpha t}$ sin $\omega t$).

**Ans**

✘ A. $(s+\omega) / \{(s+a)^2+\omega^2\}$

✘ B. $(s+a) / \{(s+a)^2+\omega^2\}$

✔ C. $\omega/\{(s+a)^2+\omega^2\}$

✘ D. $s / \{(s+a)^2+\omega^2\}$

Question ID : **60092914919**

**Q.15** Usually, modulation involves the use of the information signal to systematically vary the amplitude or the frequency or the phase of a _____ carrier.

**Ans**

✘ A. rectangular wave

✘ B. tangent wave

✘ C. cosine wave

✔ D. sinusoidal wave

Question ID : **60092914915**

**Q.16** What will happen if the supply voltage (V1) is less than the rated voltage (V2) for the capacitor used for power factor improvement?

**Ans**

✔ A. The reactive kVAR produced will be in the ratio of $V1^2/V2^2$

✘ B. The reactive kVAR produced will be in the ratio of V1/V2

✘ C. The reactive kVAR produced will be in the ratio of V2/V1

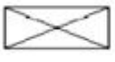
✘ D. The reactive kVAR produced will be in the ratio of $V2^2/V1^2$

Question ID : **60092914929**

**Q.17** Identify the symbol for a cartridge fuse.

**Ans**

✘ A. 

✘ B. 

✘ C. 

✔ D. 

Question ID : **60092914928**

**Q.18** If the signal x(t) is bandlimited to W; i.e., if X (f) ≡ 0 for | f | ≥ W, then what will be the sufficient sample at intervals (Ts)?

**Ans**

✔ A. Ts = 1/2W

✘ B. Ts = 4W

✘ C. Ts = 2W

✘ D. Ts = 1/4W

Question ID : **60092914917**

**Q.19** What is the name of the instrument that has in-built chemical cells and is used to measure various gases such as O2, CO, NOX and SOX?

**Ans**

✘ A. Fuel efficiency monitor

✘ B. Fyrite

✔ C. Combustion analyser

✘ D. Manometer

Question ID : **60092914926**

**Q.20** Variable frequency drive is a power electronics-based device which converts a basic fixed frequency, fixed voltage sine wave power to a variable frequency, variable output voltage used to the control speed of:

**Ans**

✗ A. repulsion motors

✗ B. commutator motors

✓ C. induction motors

✗ D. synchronous motors

Question ID : **60092914924**

Section : **Discipline3**

**Q.1** A cylinder fitted with a piston has an initial volume of 0.1 $m^3$ and contains nitrogen at 150 kPa and 27°C. The piston is moved, compressing the nitrogen until the pressure is 1 MPa and temperature is 152°C. During this compression process, work done on the nitrogen is 20 kJ. What will be the amount of heat transfer? [Gas constant (Nitrogen) = 0.3 kJ/ kg-K, specific heat at constant volume (Nitrogen) $= 0.75\ kJ/\ kg - K$ ]

**Ans**

✓ A. 4.375 kJ of heat will be rejected by the system

✗ B. 4.375 kJ of heat will be absorbed by the system

✗ C. 6.735 kJ of heat will be rejected by the system

✗ D. 6.735 kJ of heat will be absorbed by the system

Question ID : **60092914944**

**Q.2** The a four-bit ALU and function generator, 74181 belongs to which logic family?

**Ans**

✗ A. ECL

✗ B. MOS

✓ C. TTL

✗ D. CMOS

Question ID : **60092914939**

**Q.3** Which of the following is the unit of luminous flux?

**Ans**

✗ A. Candela

✓ B. Lumen

✗ C. Lux

✗ D. Luminance

Question ID : **60092914932**

**Q.4** When there is no input, output tends to be zero irrespective of initial conditions. What is the name of this type of stability?

**Ans**

✗ A. Relative stability

✓ B. Asymptotic stability

✗ C. Polar stability

✗ D. Absolute stability

Question ID : **60092914933**

**Q.5** Which of the following statements is NOT true for Routh Hurwitz stability?

**Ans**

✓ A. Range of value of K for system stability cannot be calculated.

✗ B. Frequency of oscillation at steady-state is calculated.

✗ C. Stability can be judged without solving the characteristic equation.

✗ D. Applicable only to the linear system.

Question ID : **60092914935**

**Q.6** Find the stability (using Routh Hurwitz stability criterion) of the system given as follows:

$G(s) = K / s(s + 1)$ and $H(s) = 1$.

**Ans**

✗ A. $K = 0$

✗ B. $K < 0$

✓ C. $K > 0$

✗ D. $K = 1$

Question ID : **60092914934**

**Q.7** Which of the following is an arithmetic instruction in 8085 microprocessors?

**Ans**

✗ A. RLC

✗ B. CMA

✗ C. RET

✓ D. DCR R

Question ID : **60092914940**

**Q.8** Which of the following is the correct relation? ( $C_p$ = Specific heat of substance at constant pressure, $C_v$ = Specific heat of substance at constant volume, $T$ = Absolute temperature of substance, $\alpha$ = Isothermal compressibility of the substance, $\beta$ = Volume expansivity of the substance, $v$ = Specific volume of the substance)

**Ans**

✗ A. $C_p - C_v = \frac{\alpha T \beta^2}{v}$

✗ B. $C_p - C_v = \frac{\beta T \alpha^2}{v}$

✓ C. $C_p - C_v = \frac{v T \beta^2}{\alpha}$

✗ D. $C_p - C_v = \frac{\alpha T \beta^2}{v^2}$

Question ID : **60092914945**

**Q.9** Magnetic permeability is expressed as:

($A$ = Magnetic field strength, $B$ = Magnetic flux density)

**Ans**

✗ A. $\frac{A}{B}$

✗ B. $A \times B$

✗ C. $\frac{A}{B^2}$

✓ D. $\frac{B}{A}$

Question ID : **60092914951**

**Q.10** Which of the following does NOT come under the purview of the sampling theorem?

**Ans**

✗ A.
It gives a precise lower bound on the sampling frequency required for distortion less reconstruction.

✗ B.
It provides a method of reconstruction of the original signal from the sampled values.

✗ C.
It gives a precise upper bound on the sampling interval required for distortion less reconstruction.

✓ D.
The concept of Vestigial sideband amplitude modulation is used in the sampling theorem.

Question ID : **60092914937**

**Q.11** 'The slow and progressive deformation of a material with time at constant stress' is called:

**Ans**

✓ A. creep

✗ B. fatigue

✗ C. stiffness

✗ D. plasticity

Question ID : **60092914949**

**Q.12** The atomic packing factor of a crystal structure is defined as:

(Where $A$ = Total unit cell volume, $B$ = Volume of atoms in a unit cell)

**Ans**

✗ A. $A \times B$

✗ B. $\frac{A}{B}$

✗ C. $A + B$

✓ D. $\frac{B}{A}$

Question ID : **60092914948**

**Q.13** A rigid tank (3 $m^3$ ) contains 10 kg of an ideal gas at a temperature of 300 K. An additional mass of the gas is slowly added to the tank such that the gas temperature remains constant and pressure is raised to 9 bar. What is the amount of the gas added to the tank? (Gas constant = 0.3 kJ/kg-K)

**Ans**

✗ A. 15 kg

✗ B. 10 kg

✓ C. 20 kg

✗ D. 5 kg

Question ID : **60092914947**

**Q.14** On what basis can the modulator and demodulator in an OFDM (Orthogonal Frequency Division Multiplexing) system can be implemented by use of a parallel bank of filters?

**Ans**

✗ A. Peak-to-Average Power Ratio (PAR)

✓ B. Discrete Fourier Transform (DFT)

✗ C. Quadrature Amplitude Modulation (QAM)

✗ D. Discrete-Multitone (DMT) Modulation

Question ID : **60092914936**

**Q.15** Which of the following is NOT true for the programmable DMA controller, Intel's 8257?

**Ans**

✓ A.

It is an eight-channel direct memory access (DMA) controller.

✗ B.

It maintains the DMA cycle count for each channel and outputs a control signal to notify the peripheral that the programmed number of DMA cycles is completed.

✗ C.

It is specifically designed to simplify the transfer of data at high speeds for microcomputer systems.

✗ D.

It has a priority logic that resolves the peripheral requests and issues a composite hold request to the CPU.

Question ID : **60092914941**

**Q.16** The equation of the state of a gas is given by

$p(v-b) = RT$

Which of the following is correct for this gas? ($p$ = Absolute pressure of the gas, $v$ = Specific volume, $R$ = Gas constant, $T$ = Absolute temperature, $b$ = Positive constant)

**Ans**

✗ A. Joule-Thomson coefficient is 'b'

✓ B. This gas cannot be cooled by throttling

✗ C. Joule-Thomson coefficient is always positive ($\mu > 0$)

✗ D. Joule-Thomson coefficient is always zero ($\mu = 0$)

Question ID : **60092914946**

**Q.17** Which of the following converts a discrete-time signal, which is a sequence of real or complex numbers, into a complex frequency domain representation?

**Ans**

✗ A. DCT transform

✓ B. Z transform

✗ C. Hilbert transform

✗ D. Polar transform

Question ID : **60092914938**

**Q.18** A vertical piston-cylinder device contains a gas at a pressure of 100 kPa (absolute). The piston has a mass of 5 kg and cross-sectional area 0.01 $m^2$. The pressure of the gas is increased by placing some additional weights on the piston. Determine the mass of that additional weights which will double the absolute pressure of the gas inside the cylinder. (Assume g = 10 $m/s^2$)

**Ans**

✓ A. 100 kg

✗ B. 70 kg

✗ C. 80 kg

✗ D. 90 kg

Question ID : **60092914943**

**Q.19** 'Any change that a system undergoes from one equilibrium state to another' is known as a/an _____.

**Ans**

✗ A. state

✗ B. equilibrium

✓ C. process

✗ D. property

Question ID : **60092914942**

**Q.20** Which of the following is correct about hardness testing? [$p$ = Applied load (kg), $d$ = Diagonal length of the impression (mm) ]

**Ans**

✗ A. Vickers hardness number $= 2.8544 \frac{p}{d^2}$

✗ B. Vickers hardness test uses hardened steel ball as an indenter

✓ C. Vickers hardness number $= 1.8544 \frac{p}{d^2}$

✗ D. Vickers hardness number $= 2.8544 \frac{d^2}{p}$

Question ID : **60092914950**

Section : **Discipline4**

**Q.1** 'For a planer four-bar linkage, the sum of shortest and longest link lengths cannot be greater than the sum of remaining two link lengths, if there is a continuous relative motion between the two members'. This is known as:

**Ans**

✗ A. Grubler criterion

✗ B. Rayleigh's law

✗ C. Kutzbach criterion

✓ D. Grashof's law

Question ID : **60092914961**

**Q.2** Which of the following is NOT a casting defect?

**Ans**

✗ A. Metal penetration

✓ B. Tap

✗ C. Drop

✗ D. Swell

Question ID : **60092914952**

**Q.3** A hollow sphere of an internal diameter of 10 cm and an outer diameter of 30 cm is made of a material of thermal conductivity 50 W/m-K and is used to store a liquid. The inner and outer surface temperatures of the sphere are 300 °C and 100 °C, respectively. Determine the temperature within the sphere at a radius of 7.5 cm.

**Ans**

✗ A. 220 °C

✗ B. 240 °C

✗ C. 180 °C

✓ D. 200 °C

Question ID : **60092914963**

**Q.4** In a fluid (thermal conductivity = $k$ ) flow over a horizontal surface, the temperature profile is given by

$T(y) = P + Qy + Ry^2 - Sy^3$

(Where $y$ = Distance above the plate, $P, Q, R, S$ are constants, $T_\infty$ = Free stream temperature)

The convection coefficient will be given by:

**Ans**

✔ A. $\frac{kQ}{T_\infty - P}$

✘ B. $\frac{kQ}{T_\infty - R}$

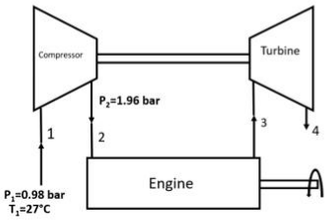
✘ C. $\frac{kP}{T_\infty - Q}$

✘ D. $\frac{kP}{T_\infty - P}$

Question ID : **60092914965**

**Q.5** A turbocharger fitted to a four-stroke CI engine draws in air (1) at a pressure of 0.98 bar and temperature of 27 °C (as shown in the given figure). The air is delivered (2) to the engine at pressure of 1.96 bar. The isentropic efficiency of the compressor is 80%. What will be the power required to run the compressor for the flow rate of air at 1 kg/s?

(Assume $2^{2/7} = 1.22$ ; Specific heat of air = 1 kJ/kg-K; Ratio of specific heat of air = 1.4)




**Ans**

✔ A. 82.5 kW

✘ B. 92.5 kW

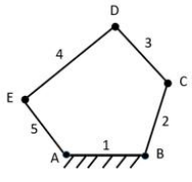
✘ C. 103.125 kW

✘ D. 115.125 kW

Question ID : **60092914971**

**Q.6** What will be the number of degrees of freedom of a plane mechanism (as in the given figure) having no higher pair?

(Links→ 1,2,3,4,5 ; Turning pair → A,B,C,D,E )




**Ans**

✘ A. 3

✘ B. 0

✘ C. 1

✔ D. 2

Question ID : **60092914959**

**Q.7** Which of the following is NOT a type of gate used in casting design?

**Ans**

✗ A. Bottom gate

✗ B. Top gate

✓ C. Blind gate

✗ D. Parting gate

Question ID : **60092914953**

**Q.8** For laminar free convection from a heated vertical surface, the local convection coefficient is expressed as $h = Cx^{-0.25}$. What will be the ratio of $\frac{h}{h_{av}}$ ?

[Where $h$ = Local convection coefficient at distance $x$ from leading edge ( $x = 0$) of the surface, C = a coefficient depends on fluid properties and independent of $x$ , $h_{av}$ = Average convection coefficient between leading edge and the $x$ location).

**Ans**

✗ A. $\frac{4}{5}$

✗ B. $\frac{5}{4}$

✓ C. $\frac{3}{4}$

✗ D. $\frac{4}{3}$

Question ID : **60092914964**

**Q.9** An air-standard diesel cycle has compression ratio as 16. Bore of the cylinder is 200 mm and stroke is 350 mm. What will be the clearance volume? (Assume $\pi = \frac{22}{7}$ )

**Ans**

✓ A. $0.000733\ m^3$

✗ B. $0.000687\ m^3$

✗ C. $0.00687\ m^3$

✗ D. $0.00733\ m^3$

Question ID : **60092914969**

**Q.10** A 2.2 kW resistance heater wire whose thermal conductivity is 15 W/m-K and which has a diameter of 4 mm and length of 0.7 m is used to boil the water. If the outer surface temperature of the resistance wire is 105°C, what will be the temperature at the centre of the wire? (Assume $\pi = \frac{22}{7}$ )

**Ans**

✓ A. 121.67 °C

✗ B. 129.33 °C

✗ C. 125.33 °C

✗ D. 118.67 °C

Question ID : **60092914962**

**Q.11** Which of the following is NOT the indirect-injection type combustion chamber of compression ignition engine?

**Ans**

✗ A. Precombustion chamber

✓ B. T-head type chamber

✗ C. Swirl or turbulent chamber

✗ D. Air-cell chamber

Question ID : **60092914970**

**Q.12** A metallic plate is to be rolled in one pass such that the final plate thickness is half of the initial thickness. Entrance speed of the plate is 10 m/min and roll diameter is 500 mm. If the plate widens by 10% during rolling, what will be the exit velocity of the plate?

**Ans**

✗ A. 11.11 m/min

✓ B. 18.18 m/min

✗ C. 22 m/min

✗ D. 15.13 m/min

Question ID : **60092914956**

**Q.13** In an ECM process for machining of iron, it is desired to obtain the metal removal rate of 1.4 $cm^3/min$ . What will be the amount of current required for the process? (Given: Atomic weight of iron = 56 gram/mol, Valency of iron =2, Density of iron = 8000 kg/ $m^3$ , Faraday's constant = 1610 amp-min/mol)

**Ans**

✗ A. 64.4 amp

✓ B. 644 amp

✗ C. 322 amp

✗ D. 6440 amp

Question ID : **60092914957**

**Q.14** What will be the brake mean effective pressure of a 4-cylinder, 4-stroke diesel engine having 140 mm bore and 200 mm stroke, which develops a brake power of 77 kW at 1200 rpm? (Assume $\pi = \frac{22}{7}$ )

**Ans**

✗ A. 5.75 bar

✗ B. 6.50 bar

✗ C. 6.00 bar

✓ D. 6.25 bar

Question ID : **60092914968**

**Q.15** What will be the true strain for a metallic bar if its final length is increased to 1.5 times of its original length by forging?

(Assume $e^{0.693} = 2$ and $e^{1.098} = 3$)

**Ans**

✗ A. 0.693

✓ B. 0.405

✗ C. 1.791

✗ D. 1.098

Question ID : **60092914955**

**Q.16** A counter-flow double-pipe heat exchanger is used to heat water from 20 °C to 80 °C at a rate of 1.2 kg/s. Heating is done by hot geothermal fluid available at 160 °C at a mass flow rate of 2 kg/s. What will be the effectiveness of the heat exchanger? (Assume specific heat of water = 4.2 kJ/kg-K, specific heat of geothermal fluid = 4.3 kJ/kg-K)

**Ans**

✗ A. $\frac{4}{7}$

✗ B. $\frac{1}{3}$

✗ C. $\frac{1}{4}$

✓ D. $\frac{3}{7}$

Question ID : **60092914967**

**Q.17** When one of the links of a kinematic chain is fixed, the chain is known as a _____.

**Ans**

✗ A. screw pair

✗ B. lower pair

✓ C. mechanism

✗ D. sliding pair

Question ID : **60092914958**

**Q.18** In a cam design, the rise motion is given by a simple harmonic motion

$s = \frac{h}{2}\left[1 - \cos\frac{\pi\theta}{\beta}\right]$

(Where $\theta = \omega t$, $h$ = Total rise, $\theta$ = Camshaft angle, $\beta$ = Total angle of rise interval, $s$ = Displacement at angle $\theta$, $\omega$ = angular speed of cam)

What will be the acceleration at $\theta = \frac{\beta}{2}$ ?

**Ans**

✗ A. $\frac{\omega h^2}{2}\left(\frac{\pi}{\beta}\right)^2$

✗ B. $\frac{h}{2}\omega^2\left(\frac{\pi^2}{\beta^2}\right)$

✗ C. $\frac{h}{2}\omega\left(\frac{\pi}{\beta}\right)^2$

✓ D. Zero

Question ID : **60092914960**

**Q.19** A steel bar, 250 mm in diameter, is turned at a feed of 0.3 mm/rev with a depth of cut of 3.5 mm. The rotational speed of the work piece is 200 rpm. The material removal rate will be:

( Assume $\pi = \frac{22}{7}$ )

**Ans**

✗ A. $2430\ mm^3/s$

✓ B. $2750\ mm^3/s$

✗ C. $2150\ mm^3/s$

✗ D. $2890\ mm^3/s$

Question ID : **60092914954**

**Q.20** A long thin-walled double-pipe heat exchanger with inner tube and outer tube diameters of 1.0 cm and 2.5 cm, respectively, is used to condense the refrigerant by water at 20 °C. The refrigerant flows through the inner tube with the convection coefficient as 5000 W/ $m^2$ -K. Water flows through the outer tube with the heat transfer coefficient as 3000 W/ $m^2$ -K. What will be the overall heat transfer coefficient of this heat exchanger, assuming no fouling?

**Ans**

✗ A. 1930 W/ $m^2$ -K

✗ B. 1825 W/ $m^2$ -K

✓ C. 1875 W/ $m^2$ -K

✗ D. 1780 W/ $m^2$ -K

Question ID : **60092914966**

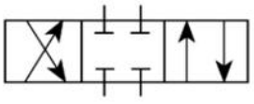
Section : **Discipline5**

Q.1 A turbojet engine flying at a speed of 300 m/s consumes air at a rate of 55 kg/s. The enthalpy change for the nozzle is 180 kJ/kg and velocity coefficient is 1. What will be the amount of the thrust produced? (Assuming air flow rate is much greater than fuel flow rate)

Ans
- ✔ A. 16500 N
- ✘ B. 165 N
- ✘ C. 165000 N
- ✘ D. 1650 N

Question ID : **60092914985**

Q.2 Which of the following is the correct description of the valve symbol shown in given figure?



Ans
- ✘ A. 2/2 Valve
- ✘ B. 4/2 Valve
- ✘ C. 5/3 Valve
- ✔ D. 4/3 Valve

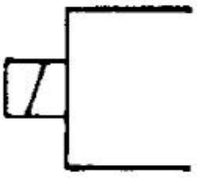
Question ID : **60092914973**

Q.3 Which of the following is NOT a type of carburetor?

Ans
- ✘ A. ABC-draught type carburetor
- ✘ B. Down-draught type carburetor
- ✘ C. Cross-draught type carburetor
- ✔ D. Up-draught type carburetor

Question ID : **60092914991**

Q.4 What is the name of the valve actuation symbol shown in the given figure?



Ans
- ✘ A. Push-button
- ✔ B. Solenoid
- ✘ C. Lever
- ✘ D. Spring

Question ID : **60092914974**

**Q.5** Which of the following is a sub-classification of structural composite?

**Ans**

✔ A. Laminar composite

✘ B. Continuous and aligned fibre composite

✘ C. Dispersion-strengthened composite

✘ D. Large-particle composite

Question ID : **60092914978**

**Q.6** Very thin single crystals that have extremely large length-to-diameter ratio is known as _____.

**Ans**

✘ A. wires

✔ B. whiskers

✘ C. cermets

✘ D. concrete

Question ID : **60092914976**

**Q.7** A surface condenser is designed to handle 12000 kg of steam per hour. The steam enters the condenser at 8 kPa and 0.9 dryness fraction. The condensate leaves the condenser at the corresponding saturation temperature. What will be the flow rate of cooling water if the cooling water temperature rise is limited to 12°C? [ $h_{fg}$ at 8 kPa = 2400 kJ/kg , $C_p$ (cooling water) = 4.2 kJ/kg-K ]

**Ans**

✔ A. 514285.7 kg/hour

✘ B. 621397.7 kg/hour

✘ C. 51428.57 kg/hour

✘ D. 514.28 kg/hour

Question ID : **60092914980**

**Q.8** A composite that consists of carbon fibre as reinforcement in carbon matrix is known as:

**Ans**

✘ A. whisker

✘ B. concrete

✘ C. metal-matrix composite

✔ D. carbon-carbon composite

Question ID : **60092914979**

**Q.9** Which of the following is the correct relation for a flow across normal shock? ( $M_1$ = Mach number upstream of the shock, $M_2$ = Mach number downstream of the shock, $k$ = Ratio of specific heat of fluid)

**Ans**

✗ A. $M_1^2 = \dfrac{M_2^2 + \frac{2}{k-1}}{\frac{2M_2^2}{k-1} - 1}$

✓ B. $M_2^2 = \dfrac{M_1^2 + \frac{2}{k-1}}{\frac{2k}{k-1} M_1^2 - 1}$

✗ C. $M_2^2 = \dfrac{M_1^2}{\frac{2k}{k-1} M_1^2 + 1}$

✗ D. $M_1^2 = \dfrac{M_2^2 + \frac{1}{k-1}}{\frac{2k}{k-1} - M_2^2}$

Question ID : **60092914987**

**Q.10** A continuous and aligned glass fibre-reinforced composite consists of 40% volume of glass fibres having a modulus of elasticity of 70 GPa and 60% volume of a polyester resin that, when hardened, displays a modulus of elasticity of 3.5 GPa. What will be the modulus of elasticity of this composite in longitudinal (alignment) direction?

**Ans**

✗ A. 28.1 GPa

✓ B. 30.1 GPa

✗ C. 73.5 GPa

✗ D. 50.1 GPa

Question ID : **60092914977**

**Q.11** A gas turbine plant operates on Brayton cycle between $T_{min}$ = 300 K and $T_{max}$ = 1200 K. What will be the pressure ratio corresponding to maximum net work output per kg of air? (Ratio of specific heat of air = 1.4)

**Ans**

✓ A. $2^{7/2}$

✗ B. $2^{7/4}$

✗ C. $2^{7/3}$

✗ D. $2^{7/5}$

Question ID : **60092914981**

**Q.12** Air flows in a duct at a pressure of 150 kPa with a velocity of 200 m/s. The temperature of air is 300 K. What will be isentropic stagnation temperature of air? (Assuming air is an ideal gas and has specific heat at constant pressure as 1.00 kJ/kg-K)

**Ans**

✗ A. 310 K

✗ B. 280 K

✗ C. 290 K

✓ D. 320 K

Question ID : **60092914984**

**Q.13** 6X2 drive chassis vehicle refers to:

**Ans**

✗ A.
a vehicle that has 4 wheels out of which only 2 are driving wheels

✗ B. a vehicle that has 6 wheels and all are driving wheels

✓ C.
a vehicle that has 6 wheels out of which only 2 are driving wheels

✗ D.
a vehicle that has 6 wheels out of which only 4 are driving wheels

Question ID : **60092914988**

**Q.14** Which of the following is the correct conversion of decimal number to binary number?

**Ans**

✗ A. $(124)_{10} = (1001111)_2$

✗ B. $(65)_{10} = (1110001)_2$

✓ C. $(122)_{10} = (1111010)_2$

✗ D. $(76)_{10} = (1001110)_2$

Question ID : **60092914975**

**Q.15** The number of degrees that the steering wheel must be turned to pivot the front wheels one degree (1°) is known as:

**Ans**

✓ A. steering ratio

✗ B. caster

✗ C. tyre ratio

✗ D. velocity ratio

Question ID : **60092914989**

**Q.16** A convergent nozzle has an exit area of 500 $mm^2$. Air enters the nozzle with a stagnation pressure of 1000 kPa and a stagnation temperature of 360 K. It has been found that at a back pressure of 528 kPa, the mass flow rate of air is 1 kg/s. Which of the following is true for this nozzle? (Given: Critical pressure ratio = 0.528)

**Ans**

✓ A.
If the back pressure is reduced to 500 kPa, the mass flow rate of air will remain 1 kg/s.

✗ B.
If the back pressure is reduced to 500 kPa, the mass flow rate of air will be less than 1 kg/s.

✗ C.
If the back pressure is reduced to 500 kPa, the mass flow rate of air will be greater than 1 kg/s.

✗ D.
If the back pressure is increased to 800 kPa, the mass flow rate of air will increase.

Question ID : **60092914986**

**Q.17** Dry saturated steam at a pressure of 11 bar enters a convergent-divergent nozzle and leaves at a pressure of 2 bar. If the flow is isentropic, what will be the throat pressure and exit velocity of steam? (Given: Critical pressure ratio = 0.58, Isentropic heat drop between inlet and exit of nozzle = 320 kJ/kg)

**Ans**

✗ A. Throat pressure = 7.37 bar
Exit velocity = 700 m/s

✓ B. Throat pressure = 6.38 bar
Exit velocity = 800 m/s

✗ C. Throat pressure = 7.37 bar
Exit velocity = 800 m/s

✗ D. Throat pressure = 6.38 bar
Exit velocity = 700 m/s

Question ID : **60092914982**

**Q.18** The angle between the king-pin centre line (or steering axis) and the vertical, in the plane of the wheel, is called:

**Ans**

✗ A. toe-in

✓ B. caster angle

✗ C. camber angle

✗ D. toe-out

Question ID : **60092914990**

**Q.19** Boolean equation for AND gate is:

(Where $A$ and $B$ are the inputs; $Q$ is the output)

**Ans**

✗ A. $\overline{A+B}=Q$

✗ B. $\overline{A\cdot B}=Q$

✓ C. $A\cdot B=Q$

✗ D. $A+B=Q$

Question ID : **60092914972**

**Q.20** What is the expression of maximum efficiency ( $E$ ) and corresponding blade speed ratio ( $R$ ) for a single stage impulse turbine? (Assuming symmetrical blades and no friction in the fluid passage; $\alpha$ = Nozzle angle)

**Ans**

✔ A. $E = cos^2\alpha\ ,\ R = \frac{cos\ \alpha}{2}$

✘ B. $E = \frac{cos^2\alpha}{2},\ R = \frac{cos\ \alpha}{2}$

✘ C. $E = \frac{cos^2\alpha}{4}\ ,\ R = \frac{cos\ \alpha}{4}$

✘ D. $E = cos^2\alpha\ ,\ R = \frac{cos\ \alpha}{4}$

Question ID : **60092914983**