

1. In the following question, select the odd figure from the given alternatives.



Ans. C

2. A is father of B. B is son of Z. Z is mother of S. S is father of K. How is B related to K?

- A. Father
- B. Son
- C. Grandson
- D. Uncle

Ans. D

3. A series is given with one term wrong. Select that wrong term from the given alternatives.

PQ, RO, TM, UJ, XI, ZG

- A. TM
- B. UJ
- C. ZG
- D. XI

Ans. B

4. A team of 5 members is to be selected from A, B, C, D, E, F, G and H. A and B can only be selected together. C cannot be selected with E and E cannot be selected with H. Which of the following is a valid team selection?

- I. A, B, C, H, G
- II. A, B, E, F, H
- III. C, D, F, G, H

- A. II and III
- B. I and III
- C. I, II and III
- D. I and II

Ans. B

5. In the following question, select the related letters from the given alternatives.

NS : MT :: AB : ?

- A. ZC
- B. BA
- C. BC
- D. ZA

Ans. A

6. In the following question below are given some statements followed by some conclusions based on those statements. Taking the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusion logically follows the given statements.

Statements:

I. All A are B.

II. No B is C.

III. All B are D.

Conclusions:

I. Some A are C.

II. Some D are A.

III. No D is C.

A. Neither conclusion follow

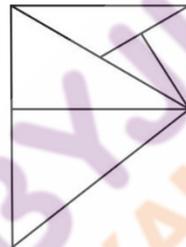
B. Only conclusion III follows

C. Only conclusion I follows

D. Only conclusion II follows

Ans. A

7. How many triangles are there in the given figure?



A. 7

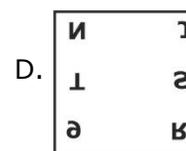
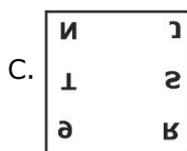
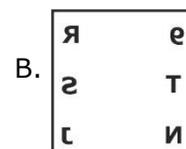
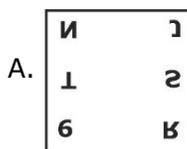
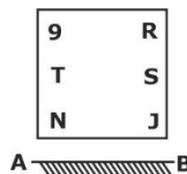
B. 8

C. 9

D. 6

Ans. B

8. If a mirror is placed on the line AB, then which of the answer figures is the right image of the given figure ?



Ans. D

9. In the following question below are given some statements followed by some conclusions based on those statements. Taking the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusion logically follows the given statements.

Statements:

I. All X are Y.

II. All Y are Z.

Conclusions:

I. Some Z are X.

II. All X are Z.

A. Only conclusion II follows

B. Only conclusion I follows

C. Neither I nor II

D. Both conclusion I and II follows

Ans. D

10. In the following question, select the odd word pair from the given alternatives.

A. Bat – Play

B. Pen – Write

C. Travel – Car

D. Water – Drink

Ans. C

11. In the following question, select the related number from the given alternatives.

43 : 78 :: 136 : ?

A. 167

B. 171

C. 173

D. 169

Ans. B

12. In a certain code language, 'PEN' is written as '35', 'TOM' is written as '48'. What is the code for 'CAL' in that code language?

A. 16

B. 34

C. 18

D. 36

Ans. A

13. A goes towards North. He then turns right and walks some distance. He then turns left and walks some distance. He turns right and walks some distance. He then turns left and walks some distance. Which direction is he facing now?

A. East

B. North

C. South

D. West

Ans. B

14. In the following question, select the odd figure from the given alternatives.



Ans. D

15. A car travels 20 km towards South. It then turns right and travels 60 km. If then turns right and travels 170 km. If then turns left and travels 20 km. How far and in which direction is car from its initial point?

- A. 220 km, North West
- B. 170 km, South West
- C. 220 km, South West
- D. 170 km, North West

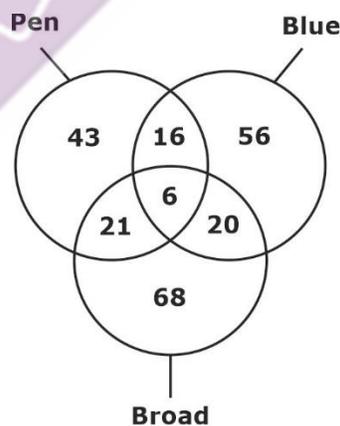
Ans. D

16. 6 books are kept over the other. B1 and B2 are always kept together. 3 books are kept above B5. B6 cannot be at top or at bottom. B1 and B2 cannot be kept with B5. Which book is at the bottom?

- A. B1 or B3
- B. B1 or B4
- C. B3 or B4
- D. B2 or B3

Ans. C

17. How many pens are blue?



- A. 16
- B. 22
- C. 26
- D. 20

Ans. B

18. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.

AD17, DH80, GL193, ?

- A. KP377
B. JP364
C. KP393
D. JP356

Ans. D

19. In the following question, select the related word pair from the given alternatives.

Carpenter : Saw :: ? : ?

- A. Musician : Flute
B. Actor : Acting
C. Pen : Writer
D. Dancer : Dance

Ans. A

20. If $4 @ 9 \# 6 = 58$ and $5 @ 8 \# 7 = 61$, then $6 @ 12 \# 3 = ?$

- A. 64
B. 36
C. 42
D. 56

Ans. C

General Awareness

1. Who won Oscar 2019 in Best Director category?

- A. Alfonso Cuarón for 'Roma'
B. Spike Lee for 'Black Klansmen'
C. Paweł Pawlikowski for 'Cold War'
D. Adam McKay for 'Vice'

Ans. A

2. The fuse wire used in Electrical Circuits is based on which principle?

- A. Ductility of wire
B. Heating effect of electricity
C. Magnetic effect of electricity
D. Electromagnetic Induction

Ans. B

3. Which Cricket nation has been suspended by ICC for violation of its Constitution in 2019?

- A. Zimbabwe
B. Kenya
C. Ireland
D. Nepal

Ans. A

4. Yanam, Part of Puducherry, is located in which Indian state?
A. Karnataka
B. Kerala
C. Tamil Nadu
D. Andhra Pradesh

Ans. D

5. भारत में भाषा के प्रचार और संरक्षण के लिए भाषाई अधिकारी की नियुक्ति कौन करता है?
A. संसद
B. राष्ट्रपति
C. भारत के मुख्य न्यायाधीश
D. प्रधानमंत्री

Ans. B

6. Which is the highest plateau in the world?
A. East African Plateau
B. Tibetan Plateau
C. Deccan Plateau
D. Western Plateau, Australia

Ans. B

7. To eliminate malaria from India by 2030, Indian council of Medical Research has launched _____.
A. 'Say no to Malaria'
B. 'MERA India'
C. 'Malaria Mukh Bharat'
D. 'Goodbye Malaria'

Ans. B

8. The property of metals by which they can be beaten into thin sheets is called _____.
A. Malleability
B. Electrical conductivity
C. Sonorous
D. Ductility

Ans. A

9. किस मुगल शासक ने आगरा का किला बनवाया?
A. जहांगीर
B. अकबर
C. औरंगजेब
D. शाहजहाँ

Ans. B

10. Which of the following rivers is a west – flowing river?
A. Godavari
B. Krishna
C. Mahanadi
D. Narmada

Ans. D

11. Hiuen Tsang came to India from which country?
A. China
B. Spain
C. Persia
D. England

Ans. A

12. नाट्य शास्त्र में, वायु संगीत वाद्ययंत्रों को _____ के अंतर्गत वर्गीकृत किया जाता है।

- A. घन वाद्य
B. अवनद्ध वाद्य
C. तत् वाद्य
D. सुषिर वाद्य

Ans. D

13. गंभीर और लंबे समय तक मंदी से जूझ रही अर्थव्यवस्था को की स्थिति में कहा जाता है।

- A. अवमूल्यन
B. मूल्यहनास
C. अपस्फीति
D. महामंदी

Ans. D

14. Feather star belongs to _____

- A. Mollusca
B. Echinodermata
C. Arthropoda
D. Protochordata

Ans. B

15. A facility under which Scheduled Commercial Banks can borrow additional amount of overnight money from Reserve Bank of India by dipping into their statutory liquidity ratio upto a limit at penal rate of interest is called _____

- A. Repo rate
B. Marginal Standing Facility
C. Bank rate
D. Liquidity Adjustment Facility

Ans. B

16. राष्ट्रकूट साम्राज्य की स्थापना किसने की?

- A. दन्तिदुर्ग
B. कीर्तिवर्मन
C. पुलकेशिन
D. सिमुका

Ans. A

17. Who won the 2019 Pulitzer prize for fiction?

- A. Tommy Orange for 'There There'
B. Richard Powers for 'The Overstory'
C. Rebecca Makkai for 'The great Believers'
D. Andrew Sean Greer for 'Less'

Ans. B

18. Which athlete won Khel Ratna 2019 in para – athletics?

- A. Swapna Burman
B. Harmeet Rajul Desai
C. Sonia Lather
D. Deepa Malik

Ans. D

19. 1920 - 22 के बीच असहयोग किसके नेतृत्व में हुआ?

- A. गोपाल कृष्ण गोखले
B. लाला लाजपत राय
C. मोतीलाल नेहरू
D. महात्मा गांधी

Ans. D

20. Under which Article of the constitution of India, special provisions regarding state of Mizoram are mentioned?

- A. Article 371 E
B. Article 371 F
C. Article 371 D
D. Article 371 G

Ans. D

Arithmetic Ability

1. The sum of circumference and the radius of a circle is 102 cm. What is the area of the circle?

- A. 628 cm²
B. 621 cm²
C. 724 cm²
D. 616 cm²

Ans. D

2. If 45682P is divisible by 12, then what is the value of P?

- A. 8
B. 2
C. 4
D. 0

Ans. A

3. What is the average of first 20 whole numbers?

- A. 10
B. 9.5
C. 10.5
D. 9

Ans. B

4. A work was finished by Rahul, Mohan and Gagan together. Rahul and Mohan together finished 75 percent of the work and Mohan and Gagan together finished 65 percent of the work. Who among the three is most efficient?

- A. Gagan
B. All one equally efficient
C. Mohan
D. Rahul

Ans. C

7. Find the value of:

$$2 + \frac{3}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{2}{3}}}}}$$

- A. 27/7
B. 32/21
C. 29/7
D. 34/21

Ans. A

8. A train of length, 240 metres, takes 36 seconds to cross a 480 metres long platform. How much time will the train take to cross a 360 metres long platform?

- A. 35 seconds
B. 25 seconds
C. 20 seconds
D. 30 seconds

Ans. D

9. Find the value of:

$$\frac{(3.2)^2 + 0.64 + 0.04}{(3.2)^3 - 0.008}$$

- A. 0.333
B. 3.4
C. 3
D. 2.994

Ans. A

10. What is the compound interest on a sum of Rs 15000 for 3 years at the rate of 20 percent per annum compounded annually?

- A. Rs 11520
B. Rs 9980
C. Rs 10720
D. Rs 10920

Ans. D

11. On selling an article for Rs 390, a shopkeeper losses 40 percent. For how much he should sell the article in order to earn a profit of 20 percent?

- A. Rs 780
B. Rs 680
C. Rs 750
D. Rs 840

Ans. A

12. If area of a square increases by 32.25 percent, then what is the increase in its side?

- A. 15 percent
B. 11.5 percent
C. 35 percent
D. 25 percent

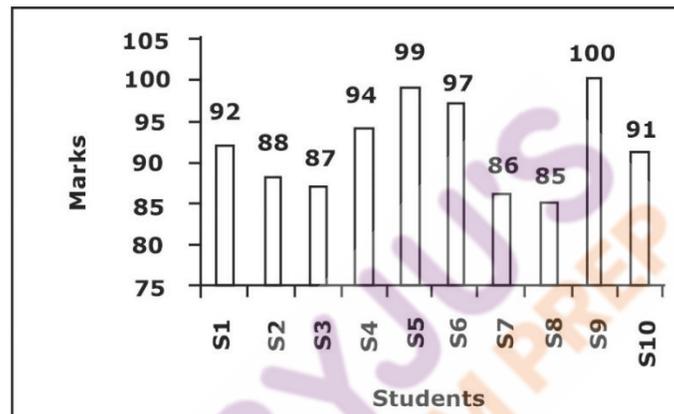
Ans. A

- 13.** Which of the following expression is/are true?
 I. Highest Common Factor of 36 and 24 is 12.
 II. Least Common Multiple of 27 and 36 is 216.
 III. 37030 is completely divisible by 15.

A. I, II, and III
 B. Only I
 C. I and II
 D. I and III

Ans. B

- 14.** The bar graph given below shows the marks out of 100 obtained by 10 students in a subject.



What is the average marks by per student?

A. 89.9
 B. 82.9
 C. 90.9
 D. 91.9

Ans. D

- 15.** A train is running at the speed of 90 km/hr. How much time will it take to cover a distance of 1200 meter?

A. 40 seconds
 B. 48 seconds
 C. 60 seconds
 D. 54 seconds

Ans. B

- 16.** The lengths of two diagonals of a rhombus are 13 cm and 24 cm. What is the area of the rhombus?

A. 315 cm²
 B. 234 cm²
 C. 156 cm²
 D. 78 cm²

Ans. C

- 17.** If $P : Q = 2 : 3$ and $Q : R = 4 : 5$, then what is $(P + Q) : (Q + R)$?

A. 8 : 15
 B. 20 : 27
 C. 2 : 3
 D. 25 : 27

Ans. B

18. Find the value of:

$$(72 + 12)^2 - (72 - 12)^2$$

- A. 3256
B. 3456
C. 3686
D. 3746

Ans. B

19. The ratio of number of boys and girls in a class is 13 : 8. If 50 boys leave the class and 50 girls join the class, then their ratio will become 4 : 3. What is the final number of the girls in the class?

- A. 400
B. 350
C. 500
D. 450

Ans. D

20. If $P = 300$ and $Q = 450$, then P is how much percentage less than Q ?

- A. 50 percent
B. 25 percent
C. 66.66 percent
D. 33.33 percent

Ans. D

General English

1. In the given question, four words are given out of which one word is correctly spelt. Choose the correctly spelt word

- A. Rhyme
B. Rhime
C. Rhiyme
D. Riyme

Ans. A

2. Rearrange the parts of the sentence in correct order. We would toast the.

P: manufactured mini-fire pit

Q: that was set up on our table

R: marshmallows over the

- A. RPQ
B. PRQ
C. RQP
D. QRP

Ans. A

3. Choose the word that is opposite in meaning to the given word.

- A. Small
B. Glob
C. Inadequate
D. Few

Ans. B

Ans. C

- 11.** Improve the bracketed part of the sentence. In case if there is no improvement, select no improvement.

An elephant is (more stronger) than a camel.

- A. No Improvement
B. more strongest
C. stronger
D. strongest

Ans. C

- 12.** A sentence has been given with a blank to be filled with an appropriate word. Choose the correct alternative.

Has a novel _____ by Navya?

- A. been written
B. been wrote
C. being writing
D. being written

Ans. A

- 13.** In the following question, out of the given four alternatives, select the alternative which best expresses the meaning of the Idiom/Phrase.

A DIME A DOZEN

- A. Something that is impossible to be bought
B. Very crucial part of something
C. Something that is extremely common and valueless
D. Far from the reach of rich people

Ans. C

- 14.** Rearrange the parts of the sentence in correct order.

Coffee contains chemical :

P: our calorie intake, triggering acne

Q: properties that boost the

R: stress hormones which tend to increase

- A. RPQ
B. QPR
C. PRQ
D. QRP

Ans. D

- 15.** A sentence has been given with a blank to be filled with an appropriate word. Choose the correct alternative.

It is half past twelve _____ my watch.

- A. from
B. in
C. by
D. on

Comprehension (16-20):

Read the following information carefully and answer the given questions. Theatre had its origins in the earliest parts of human history. Before there were actual theatres and actors, the first form of theatre can be found in the development of dance culture. Dances were originally performed in commemoration of major events, celebrations and religious ceremonies. At first, they were very informal affairs with little practice, but dancing as rituals evolved into very sophisticated forms of artistry by the 3000BCE era. The theme of religion that first originated in ritualistic dancing continued in theatre for more than four thousand years. Modern theatre has changed a lot since the time of traditional Greek Tragedies and Roman Theatrics. Today's theatre has many contrasting and diverse styles; it contains both higher levels of musical and acting talent. Greek theatre is where modern theatre draws its roots from. It is the start of the Western tradition of theatre because not only did the Greeks enjoy theatre as part of religion, but also saw it as an art form. The first steps towards Greek theatre occurred when dances and rituals to the ancient Greek God of Wine, Dionysus, became more sophisticated. The biggest change was the addition of style and theme that led to the development of plays, where spoken word was used rather than only song and dance. Formal Greek theatre is renowned for its style, themes and physical constructions. The great Greek playwrights were very interested in the development of a theme in their plays. Following Greek theatre, the next evolution of theatre occurred during the Roman era. Roman theatre was not extremely original because it took many of the elements of Greek theatre. Many Roman plays were adaptations or even direct copies of Greek plays but the biggest difference between the two is that Romans made theatre much more secular.

- 16.** What does the following phrase mean: 'Dances and rituals became very sophisticated'?
- A. Dances and rituals became more advanced
 - B. Dances and rituals became more widespread
 - C. Dances and rituals became more complicated
 - D. Dances and rituals became more problematic

Ans. A

- 17.** What is the difference between Modern theatre and Greek theatre?
- A. Modern theatre is a place for everyday life whereas Greek theatre celebrated festivals and major events.
 - B. Modern theatre has a higher level of acting unlike Greek theatre.

- C. Modern theatre focuses on music while Greek theatre focused on spoken words.
D. Modern theatre is seen as a religious place whereas Greek theatre was only considered as an art form.

Ans. B

18. How is dancing related to theatres?

- A. Dance was the reason people started going to the theatres.
B. Ritual of dancing laid the foundation of the Greek theatre.
C. Dance helped in expressing the themes of plays well.
D. Theatre is responsible for the development of dance culture.

Ans. D

19. Choose the word from the passage that is opposite in the meaning to 'identical'.

- A. Diverse
B. Renowned
C. Sophisticated
D. Informal

Ans. A

20. Which of the following pair is incorrectly matched based on the information given in the passage?

- A. Dance – religious ceremonies
B. Dionysus – Roman God
C. Roman theatre – secular
D. Greek theatre – style

Ans. B

Section: General Hindi

1. निम्नलिखित में से शुद्ध वर्तनी का चयन कीजिए।

- A. द्वीतिया
B. दिवितया
C. द्वितीया
D. द्वीतीया

Ans. C

2. दिए गए शब्द का समानार्थी शब्द ज्ञात कीजिए।

कुसुम

- A. शशि
B. पुष्प
C. सरोज
D. निशा

Ans. B

3. दिए गए वाक्य में उचित अव्यय का चयन करके रिक्त स्थान की पूर्ति कीजिए। हमारे देश की अत्यधिक प्रदूषित हो गई है।

- A. स्वतंत्रता
B. सभ्यता
C. नदियाँ
D. उदासी

Ans. C

4. रिक्त स्थान में दिए गए चार विकल्पों में उस विकल्प का चयन करे जो दिए गए मुहावरे के अर्थ को सर्वश्रेष्ठ रूप से व्यक्त करता है। जो सभी मनुष्यों को वह सचमुच महान होता है।

- A. एक और एक ग्यारह
B. आँखे दिखाना
C. एक आँख से देखना
D. ओखली में सिर देना

Ans. C

5. दिए गए शब्द का संधि विच्छेद कीजिए।

दुष्कर्म

- A. दुष् + कर्म
B. दुः + कर्म
C. दुः + ष्कर्म
D. दुष् + कर्म

Ans. B

6. निम्नलिखित में से कौन सा वाक्य सरल वाक्य है?

- A. दौड़ता हुआ कुत्ता रुक गया और मालिक को देखने लगा।
B. दौड़ता हुआ कुत्ता मालिक को देखकर रुक गया।
C. कुत्ते ने मालिक को देखा फिर दौड़ने लगा।
D. दौड़ते हुए कुत्ते ने मालिक को देखा और रुक गया।

Ans. B

7. दिए गए शब्द का समास विग्रह ज्ञात कीजिए।

बिहारीरचित

- A. बिहारी पर रचित
B. बिहारी से रचित
C. बिहारी की रचित
D. बिहारी के द्वारा रचित

Ans. D

8. निम्नलिखित में से कौन सा शब्द युग्म तत्सम - तद्भव का युग्म नहीं है?

A. पय - दूध

B. अग्नि - आग

C. जल - पानी

D. आम - आम

Ans. A

9. दिए गए वाक्य में किस विराम चिह्न का उपयोग किया गया है उसकी पहचान कीजिए।

'आतंकवाद: एक जटिल समस्या'

A. उपविराम

B. अल्पविराम

C. पूर्णविराम

D. अर्धविराम

Ans. A

10. दिए गए शब्द में उपसर्ग ज्ञात कीजिए।

उद्धार

A. उद् + हार

B. उत् + धार

C. उत् + हार

D. उद् + धार

Ans. C

11. दिए गए वाक्य का काल ज्ञात कीजिए।

वह स्कूल जा चुकी थी।

A. पूर्ण भूतकाल

B. अपूर्ण भूतकाल

C. सामान्य भूतकाल

D. संदिग्ध भूतकाल

Ans. A

12. दिए गए शब्द का पर्यायवाची ज्ञात कीजिए।

प्रसून

A. अजर

B. दृग

C. नभ

D. सुमन

Ans. D

13. दिए गए वाक्य के लिए उचित लोकोक्ति का चयन कीजिए।

सच्चा व्यक्ति किसी से नहीं डरता।

A. साँच को आँच नहीं

B. सच्चे का बोलबाला

C. साँच बराबर तप नहीं

D. सच्चे से डरना क्या

Ans. A

14. दिए गए वाक्य का वाच्य ज्ञात कीजिए।

प्रिया नमकीन खा रही है।

A. दृव्य वाच्य

B. कर्तृवाच्य

C. भाववाच्य

D. कर्मवाच्य

Ans. D

15. दिए गए वाक्य में किस प्रकार का पुरुष है ज्ञात कीजिए।

तुम सब कहाँ थे?

A. मध्यम

B. प्रथम

C. उत्तम

D. अन्य

Ans. A

Comprehension (16-20):

गद्यांश को ध्यानपूर्वक पढ़ें तथा प्रत्येक प्रश्न में चार विकल्पों में से सही विकल्प चुनें।

आधुनिक कंप्यूटर की गणना ही नहीं अपितु ढेर सारे काम करता है। रेलवे स्टेशन पर रिजर्वेशन, बड़ी-बड़ी कंपनियों की लाभ-हानि, लोगों की इच्छा-अनिच्छा क्या कुछ नहीं अब अगर ज्योतिष शास्त्र को देखें तो वह भी कंप्यूटर के बिना कुछ नहीं करता। स्वास्थ्य की जानकारी भी कंप्यूटर देता है, और तो और हम बच्चों के खेलों का साधन भी है। कंप्यूटर अब तो मनुष्य का दाया हाथ हो गया है कंप्यूटर की अपनी भाषा होती है और वे उसे ही समझता है। कंप्यूटर में वायरस भी आता है उसकी यह छूत की बीमारी जल्दी उसे जकड़ लेती है। कंप्यूटर का मिजाज जल्दी ही गर्म हो जाता है इसके लिए वातावरण को ठंडा रखना पड़ता है। 1970 तक के कंप्यूटर जितने बड़े लंबे-चौड़े आकार के होते थे वह अब इतने छोटे हो गये हैं कि ब्रीफकेस में ही समा जाता है एक अकेले व्यक्ति बिल गेट्स ने ही ऐसे सॉफ्टवेयर निर्मित किए हैं जिनसे पूरी दुनिया में तहलका मच गया। आजकल कंप्यूटर के बिना तो जैसे जीवन नीरस है चारों तरफ कंप्यूटर का ही महत्त्व है।

16. कंप्यूटर के द्वारा हम कौन सी जानकारी प्राप्त कर सकते हैं?

I. कंपनियों की लाभ-हानि

II. स्वास्थ्य की जानकारी

III. वायरस

IV. रेलवे स्टेशन का रिजर्वेशन

A. III, IV तथा II

B. I, II तथा III

C. I, III तथा IV

D. I, II तथा IV

Ans. D

17. कंप्यूटर को मनुष्य क्या मानता है?

A. जीवन

B. वातावरण

C. दायां हाथ

D. खेल

Ans. C

18. बच्चों के लिए कंप्यूटर का साधन क्या है?

A. खेलों

B. अशिक्षित

C. बिमारी

D. लड़ाई

Ans. A

19. उपर्युक्त गद्यांश का उपयुक्त शीर्षक क्या होगा?

A. खेलों का साधन

B. कंप्यूटर का मिजाज

C. बड़े लंबे - चौड़े आकार वाले कंप्यूटर

D. कंप्यूटर का महत्त्व

Ans. D

20. कंप्यूटर के लिए कैसा वातावरण रखना पड़ता है?

A. अत्यधिक गर्म

B. वर्षा

C. ठंडा

D. गर्म

Ans. C

15. For worm and gear assembly if worm diameter and rotation speed is 5 mm and 500 rpm respectively while gear diameter and rotational speed is 4 mm and 300 rpm. Therefore, find input power if, output power is 280 W with efficiency 80 percent.

- A. 350 W
- B. 320 W
- C. 360 W
- D. 370 W

Ans. A

16. Helical pair has degree of freedom:

- A. 2
- B. 3
- C. 4
- D. 1

17. Which type of gear we will use to modify the direction of drive in perpendicular direction?

- A. Compound gear
- B. Rack and pinion gear
- C. Spur gear
- D. Bevel gear

Ans. D

18. There is following relation of surface stresses with sliding friction and existence of lubricant:

- A. Directly
- B. Affected
- C. Inversely
- D. Unaffected

Ans. D

19. For disk and pad arrangement, increase of braking torque is not dependent on:

- A. Radius of center of pad contact from axis of disk rotation
- B. Number of pads
- C. Increase the pad contact area
- D. Number of disk

Ans. D

20. A steel bar is sandwiched between two copper bar and both ends are fixed, for temperature rise how much tension or compressive stress on steel bar will be found:

- A. Tensile stress twice of copper bar
- B. Compressive stress half of copper bar
- C. Tensile stress half of copper bar
- D. Compressive stress twice of copper bar

Ans. A

Section: Discipline 2

1. Which thermocouple will be used to measure temperature range -150 to -10 °C?
- silver in glass thermocouple
 - silver resistance thermocouple
 - mercury in glass thermocouple
 - platinum resistance thermocouple

Ans. D

2. What is the unit of inductance?

- | | |
|----------|----------|
| A. Henry | B. Farad |
| C. Tesla | D. Weber |

Ans. A

3. This cycle is not consists of the reversible processes:

- | | |
|-------------------|-------------------|
| A. Sterling cycle | B. Brayton cycle |
| C. Carnot cycle | D. Ericsson cycle |

Ans. B

4. Entropy of the universe is:

- | | |
|---------------|---------------|
| A. constant | B. zero |
| C. increasing | D. decreasing |

Ans. C

5. What will be the modulus of elasticity (E) of equivalent bar with area (A) which has same elongation and length of compound bar? Compound bar elasticity are E_1 , E_2 and areas are A_1 , A_2 .

- | | |
|---|---|
| A. $E = \left(\frac{A_1 E_1 + A_2 E_2}{A_1 - A_2} \right)$ | B. $E = \left(\frac{A_1 E_1 + A_2 E_2}{A_1 + A_2} \right)$ |
| C. $E = \left(\frac{A_1 E_1 - A_2 E_2}{A_1 + A_2} \right)$ | D. $E = \left(\frac{A_1 E_1 - A_2 E_2}{A_1 - A_2} \right)$ |

Ans. B

6. For throttling device this relation is correct:

- | | |
|--------------------------------|--------------------------|
| A. internal energy is constant | B. Work done is zero |
| C. enthalpy is constant | D. Work done is constant |

7. No heat transfer through the boundary of system is called:

- | | |
|----------------------|-----------------------|
| A. adiabatic process | B. isothermal process |
| C. isobaric process | D. isochoric process |

Ans. A

- 14.** For spherical shell, what is the thickness of plate (t) if p is internal pressure, D is diameter of shell, σ_{at} is permissible stress at plate in axial tension and η is the efficiency of riveted joint:

A. $t = \frac{pD}{4\eta\sigma_{at}}$

B. $t = \frac{pD}{2\eta\sigma_{at}}$

C. $t = \frac{pD}{\eta\sigma_{at}}$

D. $t = \frac{pD}{8\eta\sigma_{at}}$

Ans. A

- 15.** The isothermal process is associated with:

A. Avogadro's law

B. Gay-Lussac law

C. Boyle's law

D. Charles' law

- 16.** If two aluminum bar have different length ($L_1 = 2L_2$) and diameter ($d_1 = 2d_2$) with identical angle of twist then, find torque value for bar 1, If bar 2 torque value is 50 N-m.

A. 12.5 N-m

B. 6.25 N-m

C. 400 N-m

D. 200 N-m

Ans. C

- 17.** What is exergy of a reversible engine at temperature T into which Q heat is supplied and heat is rejected to the sink at dead state T_0 ?

A. $Q\left(\frac{1+T_0}{T}\right)$

B. $Q\left(\frac{1-T}{T_0}\right)$

C. $Q\left(\frac{1+T}{T_0}\right)$

D. $Q\left(\frac{1-T_0}{T}\right)$

Ans. D

- 18.** If effective length of aluminum ($E = 70$ GPa) column is two times of steel ($E = 190$ GPa) and Euler buckling load of aluminum is 5000 KN, then what will be the Euler buckling load (in KN) for steel with equivalent moment of inertia?

A. 27143

B. 13572

C. 6786

D. 54286

Ans. D

- 19.** For uniformly distributed load (w) acting on the beam with one end hinged and one end free if length of beam is L , distance from left hand is x , young's modulus E and moment of inertia is I then find the maximum deflection (δ_{max}) of beam:

A. $\delta_{max} = \frac{wL^4}{8EI}$

B. $\delta_{max} = \frac{wL^3}{16EI}$

C. $\delta_{max} = \frac{wL^4}{16EI}$

D. $\delta_{max} = \frac{wL^3}{8EI}$

Ans. A

Ans. A

6. Which form of iron can be produced by reduction of iron ore into blast furnace?

- A. pure iron
B. cast iron
C. direct reduced iron
D. pig iron

Ans. D

7. What is the primary cause of distortion and cracking of the heat-treated steel part?

- A. heating one section of the part more rapidly than other parts
B. increasing the soaking temperature too slowly
C. heating the part too slowly
D. uneven expansion due to carbon deposits in the part

Ans. D

8. It is not the Maxwell's equation:

- A. $\left(\frac{\partial p}{\partial T}\right)_V = \left(\frac{\partial S}{\partial V}\right)_T$
B. $\left(\frac{\partial T}{\partial V}\right)_S = -\left(\frac{\partial p}{\partial S}\right)_V$
C. $\left(\frac{\partial T}{\partial S}\right)_V = \left(\frac{\partial V}{\partial p}\right)_S$
D. $\left(\frac{\partial V}{\partial T}\right)_p = -\left(\frac{\partial S}{\partial p}\right)_T$

Ans. C

9. What is the relation between characteristics gas constant (R) specific heat at constant pressure (C_p) for ideal gas ? (Adiabatic index = γ)

- A. $C_p = \frac{R}{(\gamma - 1)}$
B. $C_p = \frac{(R - 1)}{(\gamma - 1)}$
C. $C_p = \frac{\gamma^2 R}{(\gamma - 1)}$
D. $C_p = \frac{\gamma R}{(\gamma - 1)}$

Ans. D

10. In which welding process, Wire electrode is used?

- A. Gas metal arc welding
B. submerged arc welding
C. TIG welding
D. electric resistance welding

Ans. A

11. Shrinkage and weld stress in casting is responsible for which welding defect?

- A. Rat tail
B. Lamellar tearing
C. Shrinkage void
D. Incomplete fusion

Ans. B

12. Which material has highest capacity to absorb the maximum stress for an infinite number of cycles?

- A. bronze
B. titanium
C. brass
D. chilled cast iron

Ans. B

13. For irreversible process, which relation is correct?

- A. loss of exergy is indirectly proportional to rate of entropy generation
- B. loss of exergy is directly proportional to rate of entropy generation
- C. loss of exergy has no relation with rate of entropy generation
- D. loss of exergy is equals to rate of entropy generation

Ans. B

14. What is the value of fatigue notch sensitivity for a fully sensitive material?

- A. 1
- B. infinity
- C. 0
- D. 0.5

Ans. A

15. How do you determine the soaking period when parts are uneven in cross section?

- A. by the largest section
- B. by the lightest section
- C. by the total weight
- D. by the number of parts

Ans. A

16. The ratio of the strain in a direction orthogonal to the direction of stress to the strain in the direction of stress is known as:

- A. Poisson's ratio
- B. Elastic limit
- C. Volumetric strain
- D. Shear modulus

Ans. A

17. Which property of material is necessary to produce spiral elements?

- A. resilience
- B. ductility
- C. stiffness
- D. malleability

Ans. A

18. Stirling cycle have these processes:

- A. Two reversible isobarics and two reversible isentropics
- B. Two reversible isobarics and two reversible isotherms
- C. Two reversible isochores and two reversible isentropics
- D. Two reversible isochores and two reversible isotherms

Ans. D

19. Which cutting technology principle is used for drilling of holes in a metallic substrate?

- A. oblique cutting
- B. straight cutting
- C. uniform cutting
- D. orthogonal cutting

Ans. A

5. Which of the following can be used to reverse the direction of lead screw relative to the direction of spindle movement?

- A. Speed lever
- B. Feed Lever
- C. Tumbler gear lever
- D. Friction clutch

Ans. C

6. One of which NDT method is used to detect internal weld defect/discontinuities:

- A. liquid penetration testing
- B. magnetic particle testing
- C. radiographic testing
- D. eddy current testing

Ans. C

7. If Specific volume of any material is $0.000112 \text{ m}^3/\text{kg}$, then calculate the specific gravity of that material.

- A. 7.8
- B. 8.92
- C. 9.81
- D. 8.52

Ans. B

8. Which statement is wrong when a tubular product with an encircling coil sample is inspecting by eddy current method?

- A. ID discontinuities can be found
- B. Axial discontinuity locations can be noted
- C. Circumferential discontinuity locations can be noted
- D. OD discontinuities can be found

Ans. C

9. Which dimensionless number provides the relationship between pressure force and inertia number on a fluid element?

- A. Weber number
- B. Euler number
- C. Reynolds number
- D. Froude number

Ans. B

10. What is Darcy-Weisbach formula for heat loss due to friction? Where, f = Darcy's coefficient of friction:

- A. $h_f = \frac{f l V^2}{2 g d}$
- B. $h_f = \frac{(16 f l V^2)}{2 g d}$
- C. $h_f = \frac{(f l V^2)}{2 g d}$
- D. $h_f = \frac{(4 f l V^2)}{2 g d}$

Ans. D

- 11.** In the case of steady flow, which relation is correct for stream line, streak line and path line?
- all three lines coincide
 - stream line is parallel to path line but perpendicular to streak line
 - all three lines are parallel to each other
 - stream line is parallel to streak line but perpendicular to path line

Ans. A

- 12.** When a body is floating in a liquid, is displaced slightly by external mean then this body will oscillate about which point?
- Center of buoyancy
 - Meta center
 - Center of pressure
 - Center of Gravity

Ans. B

- 13.** Which pair of hydraulic turbine you will choose, if the operating condition of head is more than 400 m and for part load operation respectively?
- Pelton wheel turbine, Kaplan turbine
 - Francis turbine and propeller turbine
 - Francis turbine and Kaplan turbine
 - Bulb turbine and Deriaz turbine

Ans. A

- 14.** For the measurement of flow rate of liquid, the method used is:
- Bourdon tube
 - Coriolis method
 - Thermal mass flow measurement
 - Conveyor-based methods

Ans. B

- 15.** What is the water pressure on the sea bottom at a depth of 6500 m? The specific gravity of sea water is assumed to be 1.03.
- 70 MPa
 - 65 MPa
 - 60 MPa
 - 75 MPa

Ans. B

- 16.** Select the correct pair of expression which defines the specific speed of hydraulic turbine and hydraulic pump.

A. $N_s = \frac{N\sqrt{Q}}{H^{3/4}}$ and $N_s = \frac{B\sqrt{P}}{H^{5/4}}$	B. $N_s = \frac{N\sqrt{P}}{H^{3/4}}$ and $N_s = \frac{N\sqrt{Q}}{H^{5/4}}$
C. $N_s = \frac{N\sqrt{Q}}{H^{5/4}}$ and $N_s = \frac{N\sqrt{P}}{H^{3/4}}$	D. $N_s = \frac{N\sqrt{P}}{H^{5/4}}$ and $N_s = \frac{N\sqrt{Q}}{H^{3/4}}$

Ans. D

- 17.** A compound pipe of diameter d_1 , d_2 and d_3 having lengths l_1 , l_2 and l_3 is to be replaced by an equivalent pipe of uniform diameter d and of the same length (l) as that of the compound pipe. The size of the equivalent pipe is given by:

A. $\frac{l}{d^3} = \left(\frac{l_1}{d_1^3}\right) + \left(\frac{l_2}{d_2^3}\right) + \left(\frac{l_3}{d_3^3}\right)$ B. $\frac{l}{d^2} = \left(\frac{l_1}{d_1^2}\right) + \left(\frac{l_2}{d_2^2}\right) + \left(\frac{l_3}{d_3^2}\right)$

C. $\frac{l}{d^2} = \left(\frac{l_1}{d_1^4}\right) + \left(\frac{l_2}{d_2^4}\right) + \left(\frac{l_3}{d_3^4}\right)$ D. $\frac{l}{d^5} = \left(\frac{l_1}{d_1^5}\right) + \left(\frac{l_2}{d_2^5}\right) + \left(\frac{l_3}{d_3^5}\right)$

Ans. D

- 18.** Which of the following can produce both external as well as internal threads?

- A. Thread chasing with multiple-rib chasers
 B. Thread tapping with taps
 C. Die threading with self-opening die heads
 D. Thread milling and multiple-thread cutters

Ans. D

- 19.** A round billet made of 70-30 brass is extruded at a temperature of 675°C ($k = 250$ MPa). The billet diameter is 100 mm, and the diameter of the extrusion is 50 mm. Calculate the extrusion force required. (given $\ln 2.5 = 0.92$)

- A. 6.6 MN B. 5 MN
 C. 4.6 MN D. 5.6 MN

Ans. D

- 20.** If cutting tool travel 1000mm in the direction of feed motion with work piece rotational speed of 500 rpm and feed rate of 0.2 mm/rev, machining time in minutes will be:

- A. 2 B. 8
 C. 10 D. 6

Ans. C

Section: Discipline 5

- 1.** Which of the following generator will be preferred if they are required to be run in parallel?

- A. Series generators B. Compound generators
 C. Shunt generators D. Shunt and series generators

Ans. C

- 2.** Permanent magnets are normally made of:

- A. cast iron B. copper
 C. alnico alloy D. wrought iron

Ans. C

3. The resistor which is nonlinear in nature is called as:

- A. Resistance
- B. Varistor
- C. specific resistance
- D. Thermistor

Ans. B

4. If the field of the synchronous motor is overexcited then its power factor will be:

- A. Lagging
- B. Zero
- C. Unity
- D. Leading

Ans. D

5. With a bank of two single phase transformers connected in V - V fashion supplying a balanced three phase load with $\text{Cos}\phi$ as power factor. The power factor of the two transformers is given by:

- A. $\text{Cos}(30-\theta)$, $\text{Cos}(30+\theta)$
- B. $\text{Cos}\theta$, $\text{Cos}(30+\theta)$
- C. $\text{Cos}\theta$, $\text{Cos}(30-\theta)$
- D. $\text{Cos}\theta$, $\text{Cos}\theta$

Ans. A

6. In which case Cavitation phenomenon occurs?

- A. Francis turbine
- B. Centrifugal pump
- C. Both Francis turbine and reciprocating pump
- D. Reciprocating pump

Ans. C

7. Which of the following parameters is used for distinguishing between a large signal and a small signal amplifier?

- A. Amplifier
- B. Input/Output impedances
- C. Harmonic distortion
- D. Frequency response

Ans. B

8. Which feature of D.C. motors is essential for traction applications?

- A. The torque is proportional to armature current
- B. Torque and speed are inversely proportional to armature current
- C. The speed is inversely proportional to the torque and the torque is proportional to square of armature current
- D. The torque is proportional to square root of armature current

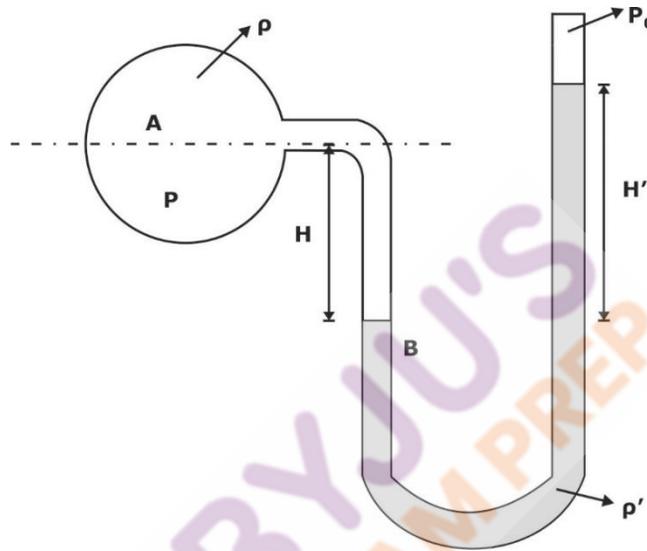
Ans. C

9. Fitting of air vessel to reciprocating pump is recommended for saving of work done and power. How much amount we can save in case of double acting reciprocating pump?

- A. 39.2 percent
B. 49.2 percent
C. 84.8 percent
D. 68.8 percent

Ans. A

10. Obtain the pressure difference ' $P-P_0$ ' in figure1.



- A. $g(2\rho'H' + \rho H)$
B. $g(\rho'H' + \rho^2 H^2)$
C. $g(\rho'H' + 2\rho H)$
D. $g(\rho'H' + \rho H)$

Ans. D

11. P-type extrinsic semiconductor doped with impurity having how much valence electron?

- A. 5
B. 1
C. 3
D. 2

Ans. C

12. In case of semiconductor, forbidden energy gap between valence band and conduction band is nearly?

- A. 1.5ev
B. 2.5ev
C. 2ev
D. 1ev

Ans. D

13. The transformer Utilization factor of a bridge rectifier is approximately:

- A. 0.41
B. 1.1
C. 0.81
D. 0.61

Ans. C

- 14.** Which galvanometer is highly sensitive in nature?
- A. Double galvanometer
B. Vibration galvanometer
C. Spot ballistic galvanometer
D. Elastic galvanometer

Ans. C

- 15.** Find out the correct conversion of hexadecimal number represented by "D" into binary number
- A. 1100
B. 1010
C. 1111
D. 1101

Ans. D

- 16.** Current amplifiers are made of which type of semiconductor device?
- A. BJT
B. JFET
C. MOSFET
D. LED

Ans. B

- 17.** In an R-L circuit connected to an alternating sinusoidal voltage, size of transient current primarily depends on:
- A. the instant in the voltage cycle at which circuit is closed
B. the circuit impedance
C. the peak value of steady-state current
D. the voltage frequency

Ans. A

- 18.** Which type of instrument is used to measure very small currents of high frequency?
- A. Thermocouple type
B. PMMC type ammeter
C. Dynamometer type
D. Inductance type

Ans. A

- 19.** Zener diode works under which region of V-I characteristics of the semiconductor diode?
- A. forward biasing
B. Reverse biasing
C. No biasing
D. Zero external voltage

Ans. B

- 20.** The algebraic function of "NOR" Logic Gate is expressed as:
- A. $F = (xy' + x'y)$
B. $F = (x-y)'$
C. $F = (x+y)'$
D. $F = (xy)'$

Ans. C
