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परीक्षा दि. ३१ ऑगस्ट २०१४   प्रश्नपुस्तिका क्रमांक
BOOKLET NO.

प्रश्नपुस्तिका
चाळणी परीक्षा

एकूण प्रश्न : 100
एकूण गुण : 200

वेळ : 1 (एक) तास

सूचना

(1) सदर प्रश्नपुस्तिकेत 100 अनिवार्य प्रश्न आहेत. उमेदवारांनी प्रश्नांची उत्तरे लिहिण्यास सुरुवात करण्यापूर्वी या प्रश्नपुस्तिकेत सर्व प्रश्न आहेत किंवा नाहीत याची खात्री करून घ्यावी. असा तसेच अन्य काही दोष आढळल्यास ही प्रश्नपुस्तिका समवेक्षकांकडून लगेच बदलून घ्यावी.

परीक्षा-क्रमांक [| | | | | | |]

(2) आपला परीक्षा-क्रमांक ह्या चौकोनांत **न विसरता बॉलपेनने** लिहावा.

केंद्राची संकेताक्षरे   शेवटचा अंक

(3) वर छापलेला प्रश्नपुस्तिका क्रमांक तुमच्या उत्तरपत्रिकेवर विशिष्ट जागी उत्तरपत्रिकेवरील सूचनेप्रमाणे **न विसरता** नमूद करावा.

(4) या प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाला 4 पर्यायी उत्तरे सुचविली असून त्यांना 1, 2, 3 आणि 4 असे क्रमांक दिलेले आहेत. त्या चार उत्तरांपैकी सर्वात योग्य उत्तराचा क्रमांक उत्तरपत्रिकेवरील सूचनेप्रमाणे तुमच्या उत्तरपत्रिकेवर नमूद करावा. अशा प्रकारे उत्तरपत्रिकेवर उत्तरक्रमांक नमूद करताना तो संबंधित प्रश्नक्रमांकासमोर छायांकित करून दर्शविला जाईल याची काळजी घ्यावी. ह्याकरिता फक्त **काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

(5) सर्व प्रश्नांना समान गुण आहेत. यास्तव सर्व प्रश्नांची उत्तरे द्यावीत. घाईमुळे चुका होणार नाहीत याची दक्षता घेऊनच शक्य तितक्या वेगाने प्रश्न सोडवावेत. क्रमाने प्रश्न सोडविणे श्रेयस्कर आहे पण **एखादा प्रश्न कठीण वाटल्यास त्यावर वेळ न घालविता पुढील प्रश्नाकडे वळावे.** अशा प्रकारे शेवटच्या प्रश्नापर्यंत पोहोचल्यानंतर वेळ शिल्लक राहिल्यास कठीण म्हणून वगळलेल्या प्रश्नांकडे परतणे सोईस्कर ठरेल.

(6) उत्तरपत्रिकेत एकदा नमूद केलेले उत्तर खोडता येणार नाही. नमूद केलेले उत्तर खोडून नव्याने उत्तर दिल्यास ते तपासले जाणार नाही.

(7) प्रस्तुत परीक्षेच्या उत्तरपत्रिकांचे मूल्यांकन करताना उमेदवाराच्या उत्तरपत्रिकेतील योग्य उत्तरांनाच गुण दिले जातील. तसेच ''उमेदवाराने वस्तुनिष्ठ बहुपर्यायी स्वरूपाच्या प्रश्नांची दिलेल्या चार पर्यायांपैकी सर्वात योग्य उत्तरेच उत्तरपत्रिकेत नमूद करावीत. अन्यथा त्यांच्या उत्तरपत्रिकेत सोडविलेल्या प्रत्येक चार चुकीच्या उत्तरांसाठी एका प्रश्नाचे गुण वजा करण्यात येतील''.

ताकीद

ह्या प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपेपर्यंत ही प्रश्नपुस्तिका आयोगाची मालमत्ता असून ती परीक्षाकक्षात उमेदवाराला परीक्षेसाठी वापरण्यास देण्यात येत आहे. ही वेळ संपेपर्यंत सदर प्रश्नपुस्तिकेची प्रत/प्रती, किंवा सदर प्रश्नपुस्तिकेतील काही आशय कोणत्याही स्वरूपात प्रत्यक्ष वा अप्रत्यक्षपणे कोणत्याही व्यक्तीस पुरविणे, तसेच प्रसिद्ध करणे हा गुन्हा असून अशी कृती करणाऱ्या व्यक्तीवर शासनाने जारी केलेल्या ''परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचा अधिनियम-82'' यातील तरतुदीनुसार तसेच प्रचलित कायद्याच्या तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

तसेच ह्या प्रश्नपत्रिकेसाठी विहित केलेली वेळ संपण्याआधी ही प्रश्नपुस्तिका अनधिकृतपणे बाळगणे हा सुद्धा गुन्हा असून तसे करणारी व्यक्ती आयोगाच्या कर्मचारीवृंदापैकी, तसेच परीक्षेच्या पर्यवेक्षकीयवृंदापैकी असली तरीही अशा व्यक्तीविरूद्ध उक्त अधिनियमानुसार कारवाई करण्यात येईल व दोषी व्यक्ती शिक्षेस पात्र होईल.

पुढील सूचना प्रश्नपुस्तिकेच्या अंतिम पृष्ठावर पहा

पर्यवेक्षकांच्या सूचनेविना ही सील उघडू नये

कच्च्या कामासाठी जागा / SPACE FOR ROUGH WORK

1. Change in entropy for isothermal process carried on a gas whose specific volume changes from V_1 to V_2 and pressure changes from P_1 to P_2 is given by :

   (1) $\Delta S = -R \log_e \dfrac{V_2}{V_1}$

   (2) $\Delta S = R \log_e \dfrac{P_2}{P_1}$

   (3) $\Delta S = -R \log_e \dfrac{P_2}{P_1}$

   (4) $\Delta S = -R \log_e \dfrac{V_2}{V_1} + R \log_e \dfrac{P_2}{P_1}$

2. Following is the outcome of first and second laws of thermodynamics.

   (1) $Q = W + \Delta u$

   (2) $T.ds = dh + v.dp$

   (3) $T.ds = dh - v.dp$

   (4) $Q = m.cp.dT$

3. Availability function is expressed as :

   (1) $\phi = U + P_o V - T_o S$

   (2) $\phi = dU + P_o V - T_o dS$

   (3) $\phi = U + P_o dV + T_o dS$

   (4) $\phi = U + P_o V + T_o S$

4. Characteristic gas constant of any perfect gas :

   (1) increases with increase in temperature

   (2) increases with increase in pressure

   (3) is a function of pressure and temperature

   (4) is a constant

5. Indicate which one of the following statements is **true** in case of two shafts connected in series :

   (1) Shear stress in each shaft is the same

   (2) Torque in each shaft is the same

   (3) Angle of twist in each shaft is the same

   (4) None of the above

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6. Maximum shear stress theory is also known as _____ .

   (1) Rankine's theory   (2) St. Venant's theory

   (3) Guest's and Tresca's theory (4) Mises and Henkey's theory

7. The variation of shear stress in a circular shaft subjected to tension is :

   (1) linear   (2) parabolic   (3) hyperbolic   (4) uniform

8. The point of contraflexture lies where _____ .

   (1) shear force changes sign   (2) bending moment is zero or changes sign

   (3) shear force is zero   (4) bending moment is maximum

9. The total strain energy stored in a body is known as :

   (1) Impact energy   (2) Proof resilience

   (3) Resilience   (4) Modulus of resilience

10. Maximum deflection of a simply supported beam with a total uniformly distributed load (w) is _____ .

   (1) $\dfrac{w\,l^3}{384\,EI}$ (2) $\dfrac{5\,w\,l^3}{384\,EI}$ (3) $\dfrac{w\,l^3}{48\,EI}$ (4) $\dfrac{5\,w\,l^3}{48\,EI}$

11. In a transversally loaded beam the maximum compressive stress occurs at the _____ .

   (1) top edge   (2) bottom edge

   (3) neutral axis   (4) none of the above

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12. When a rectangular section of a beam is subjected to a shearing force, the ratio of maximum shear stress to the average shear stress is :

    (1) 2.0   (2) 1.75   (3) 1.5   (4) 1.25

13. The curie temperature for interstitial solid solution of carbon in low temperature BCC-α iron is :

    (1) 910°C   (2) 768°C   (3) 1400°C   (4) 727°C

14. Graphite in the form of flakes is observed in :

    (1) spheroidal graphite cast iron   (2) gray cast iron

    (3) white heart malleable   (4) black heart malleable

15. The fatigue strength of mild steel is :

    (1) Equal to its tensile strength   (2) Equal to its yield strength

    (3) More than its tensile strength   (4) Lower than its yield strength

16. Nitriding is a process used to :

    (1) reduce the wear resistance   (2) increase the wear resistance

    (3) increase the surface hardness   (4) none of the above

17. The percentage of chromium in stainless steel used for cutlery is usually in the range of _____.

    (1) 0.5% to 1.1%   (2) 1.2% to 2.7%   (3) 10% to 20%   (4) 20% to 30%

18. Austenite F.C.C structure is found at _____ temperature.

    (1) 1333°F to 2066°F   (2) 1670°F to 2500°F

    (3) 1333°F to 2702°F   (4) 2066°F to 2802°F

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19. The maximum diameter of bubble formed on the heating surface depends on :

    (1)   Tension between liquid and vapour

    (2)   Tension between liquid and solid surface

    (3)   Tension between vapour and solid surface

    (4)   All of the above

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20. "Total emissive power from a radiating plane surface in any direction is directly proportional to the cosine of the angle of emission". This is called as :

    (1)   Law of radiation   (2)   Lambert's law

    (3)   Law of emission   (4)   Stefen-Boltzmann law

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21. Hot gases escaping from the chimney rise by convection and then diffuse into the air above the chimney is an example of :

    (1)   Mass transfer by diffusion   (2)   Mass transfer by convection

    (3)   Eddy diffusion   (4)   Mass transfer by change of phase

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22. The region of flow which develops from the leading edge of the plate in which the effects of viscosity are observed is called as :

    (1)   Viscous layer   (2)   Boundary layer thickness

    (3)   Boundary layer   (4)   Inviscid layer

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23. A connecting rod, should be _____ for buckling about X-axis.

    (1)   both ends fixed

    (2)   both ends hinged

    (3)   one end fixed and the other end hinged

    (4)   one end fixed and the other end free

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24. When a shaft is subjected to a bending moment (M) and a twisting moment (T), then the equivalent twisting moment is equal to :

(1) $M + T$ (2) $M^2 + T^2$ (3) $\sqrt{M^2 + T^2}$ (4) $\sqrt{M^2 - T^2}$

25. A spring-mass system having a mass of 10 kg and spring stiffness of 4000 N/m vibrates on a horizontal surface. Its natural frequency of vibration is :

(1) 5 rad/sec   (2) 10 rad/sec   (3) 15 rad/sec   (4) 20 rad/sec

26. Two close coiled helical springs with stiffness K_1 and K_2 respectively are connected in series. The stiffness of an equivalent spring is given by :

(1) $\dfrac{K_1 . K_2}{K_1 + K_2}$ (2) $\dfrac{K_1 - K_2}{K_1 + K_2}$ (3) $\dfrac{K_1 + K_2}{K_1 . K_2}$ (4) $\dfrac{K_1 - K_2}{K_1 . K_2}$

27. The term _____ is used for ROM that can be programmed and their contents altered. Such a chip contains a series of small electronic circuit cells which can store charge.

(1) R.O.M.   (2) P.R.O.M.   (3) E.P.R.O.M.   (4) E.E.P.R.O.M.

28. CPU in microprocessor is used to :

(1) Handle communication between microprocessor and outside world

(2) To hold the program instruction and data

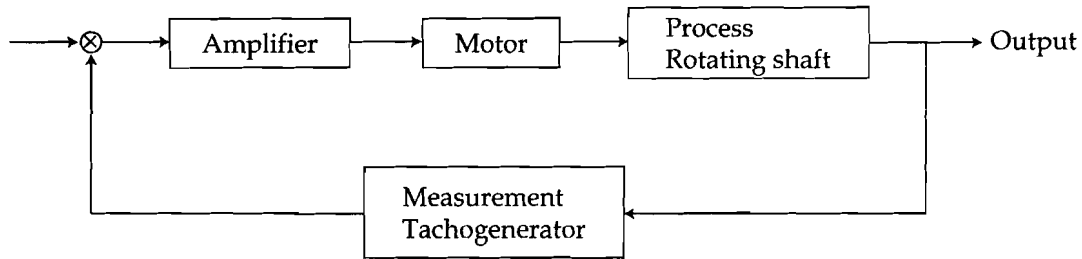(3) Recognise and carry out program instructions

(4) All of the above

29. Root of the characteristic equation of control system influence its :

(1) Steady state response   (2) Steady state and transient response

(3) Transient response and stability   (4) None of the above

SPACE FOR ROUGH WORK

30. State the type of control system used below :

(1) Open Loop Control System   (2) Closed Loop Control System

(3) Sequential Control System   (4) None of the above

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31. _____ is the length of the pitch circle diameter per tooth.

(1) Addendum   (2) Module   (3) Backlash   (4) Face width

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32. The coriolis acceleration component can be estimated by using equation :

(1) ωv (2) $2\,\omega v$ (3) $3\,\omega v$ (4) $4\,\omega v$

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33. In multiplate clutch the total no. of disks equals to :

(1) number of pairs of contacting surfaces $+1$

(2) number of pairs of contacting surfaces -1

(3) number of pressure plates -1

(4) number of pressure plates $+1$

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34. The size of a cam depends upon :

(1) Base circle   (2) Pitch circle   (3) Prime circle   (4) Pitch curve

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SPACE FOR ROUGH WORK

35. Match the following :

(a)	G 41	(i)	Absolute dimensioning
(b)	G 42	(ii)	Incremental dimensioning
(c)	G 90	(iii)	Cutter compensation left
(d)	G 91	(iv)	Cutter compensation right

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(ii)	(i)	(iv)	(iii)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(iv)	(iii)	(ii)	(i)

36. The sintering temperature and time vary with the following factors :

(a) Type of metal powder.

(b) Compressive load used.

(c) Strength requirements of finished parts.

(d) None of the above

Which of the statements given below is/are **correct** ?

(1) (a), (b) only

(2) (b) and (c) only

(3) (a), (b) and (c) only

(4) (d) only

37. Which of the following expressions **does not** represent the speed of sound in medium ?

(1) $\sqrt{\dfrac{K}{\rho}}$　　(2) $\sqrt{\nu RT}$　　(3) $\sqrt{K.\dfrac{P}{\rho}}$　　(4) $\sqrt{\dfrac{dp}{d\rho}}$

SPACE FOR ROUGH WORK

P.T.O.

38. In a rotating fluid flow system

V = absolute velocity of a jet

V_r = relative velocity of the same jet with respect to its nozzle and

u = absolute velocity of the nozzle.

The relationship between these vectors is :

(1) $V = V_r + u$ (2) $V = V_r - u$ (3) $V_r = V + u$ (4) $u = V + v_r$

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39. The power transmitted through the pipe is maximum when head loss due to friction in pipe is equal to _____.

(1) $\dfrac{1}{3}^{rd}$ of the total supply head   (2) $\dfrac{1}{4}^{th}$ of the total supply head

(3) $\dfrac{1}{5}^{th}$ of the total supply head   (4) $\dfrac{1}{8}^{th}$ of the total supply head

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40. In two dimensional (x, y) flow acceleration component in the X- direction is given by $a_x =$

(1) $\dfrac{\partial u}{\partial t} + u \dfrac{\partial u}{\partial x} + v \dfrac{\partial v}{\partial y}$ (2) $u \dfrac{\partial u}{\partial x} + v \dfrac{\partial u}{\partial y}$

(3) $\dfrac{\partial u}{\partial t} + u \dfrac{\partial u}{\partial x} + v \dfrac{\partial u}{\partial y}$ (4) $u \dfrac{\partial u}{\partial t} + v \dfrac{\partial u}{\partial x} + u \dfrac{\partial v}{\partial y}$

where, u, v are the velocity components in x and y directions respectively and t is time.

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41. If a vessel containing liquid moves downward with a constant acceleration, then :

(1) the pressure throughout the liquid mass is atmospheric

(2) the pressure in the liquid mass is greater than the hydrostatic pressure

(3) there will be vacuum in the liquid

(4) the pressure throughout the liquid mass is greater than atmospheric

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SPACE FOR ROUGH WORK

42. If the velocity u in a turbulent boundary layer varies as $y^{1/7}$, the growth of the boundary layer thickness δ/x varies as :

(1) $Re_x^{-1/5}$ (2) $Re_x^{-1/2}$ (3) $Re_x^{-4/5}$ (4) Re_x^{-1}

Where Rex is the local Reynold's number.

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43. In axially loaded elastic member stiffness 'k' is :

(1) Directly proportional to Young's modulus and inversely proportional to area of cross section

(2) Directly proportional to member length and inversely proportional to area of cross section

(3) Directly proportional to Young's modulus and inversely proportional to member length

(4) Inversely proportional to member length and inversely proportional to Young's modulus

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44. Instrument that measures pressure is generally classified as :

(1) Non - linear   (2) Linear

(3) Free of hysteresis   (4) None of the above

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45. The least count of a metric vernier calliper having 25 divisions on vernier scale matching with 24 divisions on main scale (1 main scale division = 0.5 mm) is _____.

(1) 0.05 mm   (2) 0.01 mm   (3) 0.02 mm   (4) 0.001 mm

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46. Slope of calibration curve indicates its :

(1) Resolution   (2) Repeatability   (3) Static sensitivity (4) Hysterris

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SPACE FOR ROUGH WORK

47. If the critical ratio is less than one, then it indicates that _____.

    (1) the job is already late

    (2) the job is on schedule

    (3) the job has some slack available to it

    (4) the top priority should not be given

48. For the first setup in applying SMED to a particular machine, which time must be analysed first for that machine :

    (1) lead time   (2) manufacturing time

    (3) production time   (4) setup time

49. Around the rated (full load) speed, the slip of the induction motor is _____ and the torque - slip relationship is _____ in the region.

    (1) low, non-linear   (2) high, linear   (3) low, linear   (4) high, non-linear

50. Which of the following induction motors, has highest starting torque ?

    (1) Squirrel cage   (2) Slip ring

    (3) Deep bar squirrel cage   (4) Double bar squirrel cage

51. In stepper motor, step angle α is given by _____

    where, $\dfrac{M_s}{N_r}$ = No. of stator phases = No. of rotor teeth

    (1) $\alpha = \dfrac{360°}{M_s N_r}$ (2) $\alpha = \dfrac{M_s N_r}{360°}$

    (3) $\alpha = \dfrac{M_s}{N_r} \times 360°$ (4) $\alpha = \dfrac{N_r}{M_s} \times 360°$

SPACE FOR ROUGH WORK

52. In a synchronous generator delivering lagging power factor load _____.

    (1) the excitation emf leads terminal voltage by the power angle

    (2) the excitation emf lags terminal voltage by the power angle

    (3) the excitation voltage is in phase with the terminal voltage

    (4) none of these

53. Which of the following statements related to a transformer are **incorrect** ?

    (a) The maximum voltage regulation occurs at leading pf

    (b) The maximum voltage regulation occurs at lagging pf

    (c) The voltage regulation at zero pf is always zero

    (d) The voltage regulation can be negative at leading pf

    Answer options :

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

54. Two alternators are connected in parallel and the active power shared remains constant. The reactive power shared by them can be controlled by :

    (1) Changing the mechanical power input only

    (2) Changing the excitation only

    (3) Changing both excitation and mechanical power input

    (4) None of the above

55. Why is ring feeder preferred over radial feeder in distribution system ?

    (a) Voltage drop in the feeder is less

    (b) Power factor is higher

    (c) Supply is more reliable

    Select the correct option :

    (1) (a) and (b)   (2) (b) and (c)   (3) (a) and (c)   (4) (a), (b) and (c)

SPACE FOR ROUGH WORK

P.T.O.

56. The long transmission line gives better voltage profile at rated load when :

(1) Shunt reactor is at sending end

(2) Shunt capacitance is at sending end

(3) Shunt capacitor is at receiving end

(4) Shunt reactor is at receiving end

57. The DC resistance of transmission line is less than its AC resistance due to :

(1) Proximity effect   (2) Skin effect

(3) Both (1) and (2)   (4) None of the above

58. More efficient plants are used as :

(1) Base load stations   (2) Peak load stations

(3) Both (1) and (2)   (4) None of the above

59. Loss angle of cable is δ then power factor of the cable is given by :

(1) Cosδ   (2) Sinδ

(3) Independent of δ   (4) None of the above

60. In order to have lower cost of Electrical energy generation :

(1) load factor and diversity factor should be low

(2) load factor should be low but diversity factor should be high

(3) load factor should be high but diversity factor should be low

(4) load factor and diversity factor should be high

SPACE FOR ROUGH WORK

61. A transfer function may be defined only for a :

(1) Linear and stationary system

(2) Non-linear and stationary system

(3) Linear and non-stationary system

(4) Non-linear and non-stationary system

62. A PD controller is used to compensate a system. Compared to the uncompensated system, the compensated system has :

(1) A higher type number

(2) Zero steady state error

(3) Improved transient response

(4) Larger transient overshoot

63. A.C. Tachometer :

(a) works on the principle of induction generator

(b) is brushless

(c) reduces ripple

(d) increases electro-magnetic noise

Answer options :

(1) only (a)

(2) (a) and (b)

(3) (a), (b) and (c)

(4) All four (a), (b), (c) and (d)

64. As compared to closed loop system, an open loop system is :

(1) more stable as well as more accurate

(2) less stable as well as less accurate

(3) more stable but less accurate

(4) less stable but more accurate

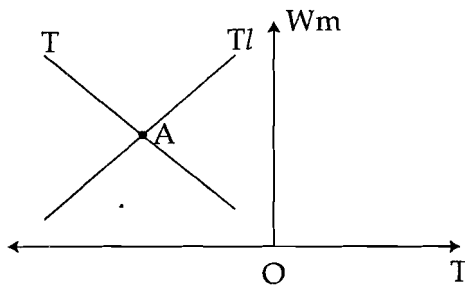**SPACE FOR ROUGH WORK**

65. In which of the following modes the torque will be negative ?

(1) Forward motoring and reverse motoring

(2) Forward regeneration and reverse regeneration

(3) Forward motoring and reverse regeneration

(4) Forward regeneration and reverse motoring

66. Comment on the stability of the operating point A :

(1) Unstable (2) Marginally stable

(3) Stable (4) Cannot find out

67. An eddy current clutch is identical in principle to an induction motor in which :

(1) stator is allowed to rotate

(2) rotor is allowed to rotate

(3) both stator and rotor are allowed to rotate

(4) none of the above

68. Which of the following is **not** a standard class of motor duty ?

(1) Intermittent periodic duty

(2) Intermittent duty with periodic speed changes

(3) Short time duty

(4) Intermittent duty, periodic duty with starting and braking

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69. The prime mover to the ward Leonard system using a heavy intermittent load cannot be :

(1) Slip ring induction motor

(2) Sychronous motor

(3) Cage induction motor

(4) D.C. shunt motor

70. A 220 V, 1500 rpm, 50 A, separately excited motors with armature resistance of 0.5 Ω is fed from a circulating current dual converter with ac voltage (line) = 165 V. The converter firing angles for braking operation at rated motor torque and 1000 rpm will be :

(1) $\alpha_A = 61.9$ $\alpha_B = 118.1$

(2) $\alpha_A = 118.1$ $\alpha_B = 61.9$

(3) $\alpha_A = 61.9$ $\alpha_B = 61.9$

(4) $\alpha_A = 118.1$ $\alpha_B = 118.1$

71. Diversity factor is :

(1) Always less than one

(2) Always greater than one

(3) Could be equal to one

(4) None of these

72. The cost of power generation can be reduced by :

(a) Selecting equipment of longer life and proper capacities

(b) Running the power station at high load factor

(c) Increasing the efficiency of the power plant
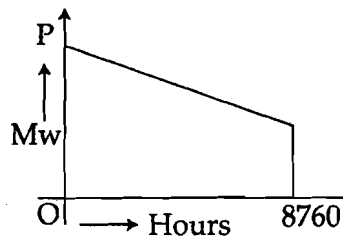
(d) Decreasing the down time of equipment

Answer options :

(1) (a) only

(2) (b) only

(3) (a) and (c)

(4) (a), (b), (c), (d) all

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73. The curve shown in the figure is :

(1) Chronological load curve   (2) Flow duration curve

(3) Mass curve   (4) Annual load duration curve

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74. In availability based tariff mechanism, unscheduled interchange means :

(a) Power supplied by a generator other than its scheduled generation

(b) Exchange of power between two distribution utilities

(c) Exchange of power between generation and distribution utility

(d) Power drawn by distribution utility other than scheduled drawal

Answer options :

(1) (a) only   (2) (b) and (c) only

(3) (d) only   (4) (a) and (d)

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75. In the electricity tariff mechanism, ABT stands for _____ .

(1) Actual Base Tariff   (2) Activity Based Tariff

(3) Availability Based Tariff   (4) Anticipation Based Tariff

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76. Cost of power generation for a thermal station mainly depends on :

(1) Employee cost   (2) Maintenance cost

(3) Fuel cost   (4) Project cost

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77. In a pump installation the local atmospheric pressure is 9.8 m of water, vapour pressure head is 0.4 m (abs.), height of the pump above sump water level is 5 m. For head loss in the suction side is 0.6 m, the NPSH is :

    (1) 3.8 m   (2) 5.0 m   (3) 4.0 m   (4) 15.8 m

78. The meter constant of an energy meter is expressed in terms of revolutions per _____ .

    (1) kW   (2) kWh   (3) minute   (4) second

79. A metal strain gauge has factor of two. Its nominal resistance is 120 Ω . If it undergoes a strain of 10^{-5} the value of change of resistance in response to the strain is :

    (1) 240 ohm   (2) 2×10^{-5} ohm   (3) 240×10^{-5} ohm   (4) 1.2×10^{-3} ohm

80. Megger is an instrument used for measurement of _____ .

    (1) low resistance

    (2) medium resistance

    (3) high resistance and insulation resistance

    (4) leakage current

81. In case of induction motor the ratio of core length to the pole pitch for good efficiency is taken as :

    (1) 1.0   (2) 1.5   (3) 2.0   (4) 5.0

82. "Pick-up" is another name for :

    (1) Strain gauge   (2) Synchros   (3) Accelerometer   (4) Transducer

83. For Simplex Lap winding the winding pitch is equal to :

    (1) +1   (2) -2   (3) ±1   (4) ±2

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84. The rotor of squirrel cage induction machine designed with a high value of rotor current density results in :

(1) Low starting torque and lower efficiency

(2) Low starting torque and higher efficiency

(3) High starting torque and higher efficiency

(4) High starting torque and lower efficiency

85. Percentage leakage reactance in a distribution transformer has to be :

(1) 3 to 4%   (2) 4 to 5%   (3) 1 to 2%   (4) 6 to 13%

86. The heat dissipating capability of oil immersed transformers of rating higher than 30 kVA is increased by providing :

(1) Fins, tubes, fans and radiator tank

(2) Corrugations, fins, tubes, radiator tank

(3) Auxiliary fins, water tubes and corrugations

(4) Heat sinks, fins, tubes and corrugations

87. In a synchronous generator in order to eliminate the fifth harmonic the chording angle should be :

(1) 0°   (2) 18°   (3) 27°   (4) 36°

88. For a particular value of B_{max}, increasing the number of steps of the core of a transformer :

(1) Reduces the copper used in the transformer

(2) Reduces the iron used in the transformer

(3) Reduces the iron and increases the copper used in the transformer

(4) Both (1) and (2)

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89. Specific power (kWth/kg) of which reactor is the highest ?

    (1) Pressurized water reactor
    (2) Boiling water reactor
    (3) Liquid metal fast breeder reactor
    (4) High temperature gas cooled reactor

90. Which type of following nuclear reactors has highest thermal efficiency ?

    (1) Pressurized water reactor
    (2) Boiling water reactor
    (3) Sodium graphite reactor
    (4) Gas cooled reactor

91. Intercooling in gas turbines :

    (1) decreases net output but increases thermal efficiency
    (2) increases net output but decreases thermal efficiency
    (3) decreases both net output and thermal efficiency
    (4) increases both net output and thermal efficiency

92. Preheating of inlet water of a boiler by exhaust gas in steam plant is done in :

    (1) Super heater   (2) Economiser   (3) Damper   (4) Steam trap

93. Which of the following helps in stabilizing the velocity and pressure in the penstock in hydroelectric power plant ?

    (1) Draft tube   (2) Forebay   (3) Surge tank   (4) Tail race

94. When a nuclear reactor is operating at constant power the multiplication factor is :

    (1) less than unity
    (2) greater than unity
    (3) equal to unity
    (4) none of the above

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95. The solar photovoltaic cell is prepared using semiconductor materials. Based on commonly used technology for solar cell manufacturing, consider following statements :

  (a) 'Si' is an indirect band gap semiconductor

  (b) 'CdTe' is a direct band gap semiconductor

  (c) Direct band gap semiconductors require both photon and phonon particles where as indirect band gap semiconductor requires only photons for excitation

  (d) 'Si' based solar PV cells are thicker than that of 'CdTe' based solar PV cell

  In above

  (1) All four statements are **true**

  (2) (a) and (b) are **true** but (c) and (d) are **false**

  (3) (a), (b) and (d) are **true** but (c) is **false**

  (4) All four statements are **false**

96. The rotor blades on a horizontal axis wind turbine rotate because of :

  (1) drag   (2) lift

  (3) wind speed   (4) atmospheric pressure

97. Which one is the solar radiation measuring instrument ?

  (1) Pyroheliometer   (2) Thermoheliometer

  (3) Thermometer   (4) Lux meter

98. Which type is the wind electric generator ?

  (1) Synchronous generator   (2) Induction generator

  (3) Doubly fed induction generator (4) Any one of the above

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99. In solar system, concentrator is the optical system that :

    (1)   absorbs beam radiation into the receiver

    (2)   converts beam energy into heat energy

    (3)   directs beam radiation onto the receiver

    (4)   reflects beam radiation away from the receiver

100. The optimum rotational frequency of a turbine in a particular wind speed decreases with :

    (1)   decrease in radius of turbine   (2)   increase in height of turbine

    (3)   increase in radius of turbine   (4)   decrease in circumference of turbine blade

-o0o-

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सूचना — (पृष्ठ 1 वरून पुढे....)

(8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त उत्तरपत्रिकेवर वा इतर कागदावर कच्चे काम केल्यास ते कॉपी करण्याच्या उद्देशाने केले आहे, असे मानले जाईल व त्यानुसार उमेदवारावर शासनाने जारी केलेल्या ''परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचे अधिनियम-82'' यातील तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

(9) सदर प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपल्यानंतर उमेदवाराला ही प्रश्नपुस्तिका स्वतःबरोबर परीक्षाकक्षाबाहेर घेऊन जाण्यास परवानगी आहे. **मात्र परीक्षा कक्षाबाहेर जाण्यापूर्वी उमेदवाराने आपल्या उत्तरपत्रिकेचा भाग-1 समवेक्षकाकडे न विसरता परत करणे आवश्यक आहे.**

नमुना प्रश्न

Pick out the correct word to fill in the blank :

Q. No. 201. I congratulate you _____ your grand success.

(1) for (2) at (3) on (4) about

ह्या प्रश्नाचे योग्य उत्तर ''(3) on'' असे आहे. त्यामुळे या प्रश्नाचे उत्तर ''(3)'' होईल. यास्तव खालीलप्रमाणे प्रश्न क्र. 201 समोरील उत्तर-क्रमांक ''③'' हे वर्तुळ पूर्णपणे छायांकित करून दाखविणे आवश्यक आहे.

प्र. क्र. 201.   ① ② ● ④

अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तरक्रमांक हा तुम्हाला स्वतंत्ररीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित वर्तुळ पूर्णपणे छायांकित करून दाखवावा. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK